Simple Poverty Scorecard® Poverty-Assessment Tool Bolivia

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2 December 2009

A more-current scorecard than this one in English is at `SimplePovertyScorecard.com`. Un índice más actualizado que éste en Castellano se encuentra en `SimplePovertyScorecard.com`.

Abstract

The Simple Poverty Scorecard-brand poverty-assessment tool uses ten low-cost indicators from Bolivia's 2007 Household Survey to estimate the likelihood that a household has income below a given poverty line. Field workers can collect responses in about ten minutes. The scorecard's accuracy is reported for a range of poverty lines. The scorecard is a practical way for pro-poor programs in Bolivia to measure poverty rates, to track changes in poverty rates over time, and to segment clients for targeted services.

Version note

This paper uses 2007 data, replacing Schreiner (2007), which uses 2002 data. The new 2007 scorecard here should be used from now on. Both scorecards use the same definition of *poverty*, so existing users of Schreiner (2007) can still measure change over time using the national poverty line with a baseline from the old 2002 scorecard and a follow-up from the new 2007 scorecard.

Acknowledgements

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Simple Poverty Scorecard® Poverty-Assessment Tool

Interview ID: _____		**Name**	**Identifier**
Interview date: _____	Participant: _____		_____
Country: BOL	Field agent: _____		_____
Scorecard: 002	Service point: _____		_____
Sampling wgt.: _____		Number of household members:	

Indicator	Response	Points	Score
1. How many household members are there?	A. Seven or more	0	
	B. Six	7	
	C. Five	11	
	D. Four	16	
	E. Three	17	
	F. Two	26	
	G. One	35	
2. How many household members ages 6 to 17 currently attend school at the level and grade that they enrolled in for this calendar year?	A. Not all	0	
	B. All	2	
	C. No children ages 6 to 17	4	
3. What is the main construction material of the floors of the residence?	A. Earth, bricks, or other	0	
	B. Wooden planks, cement, hardwood floors, parquet, rugs or carpets	4	
	C. Tile (mosaic, stone, or ceramic)	10	
4. What is the main fuel used for cooking?	A. Firewood, dung/manure, kerosene, LPG in a cylinder, or other	0	
	B. Piped-in natural gas, electricity, or does not cook	7	
5. Does the household own, have, or use a refrigerator or freezer?	A. No	0	
	B. Yes	5	
6. Does the household own, have, or use a dining-room set (table and chairs)?	A. No	0	
	B. Yes	5	
7. Does the household own, have, or use a television?	A. No	0	
	B. Yes	10	
8. Does the household own, have, or use a VCR or DVD player?	A. No	0	
	B. Yes	6	
9. Does the household own, have, or use a stereo or hi-fi system?	A. No	0	
	B. Yes	5	
10. Are any household members employed in blue-collar or white-collar jobs?	A. No	0	
	B. Yes	13	

Score:

Simple Poverty Scorecard® Poverty-Assessment Tool Bolivia

1. Introduction

The Simple Poverty Scorecard poverty-assessment tool is a low-cost way for pro-poor programs in Bolivia to estimate the likelihood that a household has income below a given poverty line. This poverty likelihood can then be used to monitor groups' poverty rates at a point in time, to track changes in groups' poverty rates between two points in time, and to target services to households.

The direct approach to poverty measurement via surveys is difficult and costly. As a case in point, Bolivia's 2007 Household Survey (*Encuesta de Hogares*) runs more than 50 pages. The expenditure module includes hundreds of questions such as "In the past month, did your household buy, obtain, or consume any bread? If yes, how frequently did you buy bread? How much bread did you usually buy each time? How much did this amount of bread cost? How frequently did you consume bread that you produced yourself? . . . Now, then in the past two weeks, did anyone in the household buy, obtain, or consume any cookies or crackers? . . ."

In contrast, the indirect approach via the scorecard is simple, quick, and inexpensive. It uses ten verifiable indicators (such as "What is the main fuel used for cooking?" or "Does the household own, have, or use a television?") to get a score that is

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highly correlated with poverty status as measured by income from the exhaustive survey.

The scorecard here differs from "proxy means tests" (Coady, Grosh, and Hoddinott, 2002) in that it is tailored to the capabilities and purposes not of national governments but rather of local, pro-poor organizations. The feasible poverty-measurement options for these local organizations are typically subjective and relative (such as participatory wealth ranking by skilled field workers) or blunt (such as rules based on land-ownership or housing quality). These approaches may be costly, their results are not comparable across organizations nor across countries, and their accuracy and precision are unknown.

Suppose an organization wants to know what share of its participants are below a poverty line, perhaps because it wants to relate its participants' poverty status to the Millennium Development Goals' $1.25/day poverty line at 2005 purchase-power parity. Or an organization might want to report how many of its participants are among the poorest half of people below the national poverty line (as required of USAID microenterprise partners). Or perhaps an organization might want to measure movement across a poverty line (see, for example, Daley-Harris, 2009). In all these cases, what is needed is an income-based, objective tool with known accuracy that can serve for monitoring, management, and/or targeting. While income surveys are costly even for governments, many small, local organizations can implement an inexpensive scorecard.

The statistical approach here aims to be understood by non-specialists. After all, if managers are to adopt the scorecard on their own and apply it to inform their decisions, they must first trust that it works. Transparency and simplicity build trust. Getting "buy-in" matters; proxy means tests and regressions on the "determinants of poverty" have been around for three decades, but they are rarely used to inform decisions by local pro-poor organizations. This is not because these tools do not work, but because they are presented (when they are presented at all) as tables of regression coefficients incomprehensible to non-specialists (with indicator names such as "`LGHHSZ_2`", negative points, and points with many decimal places). Thanks to the predictive-modeling phenomenon known as the "flat maximum", simple scorecards are about as accurate as complex ones.

The technical approach here is also innovative in how it associates scores with poverty likelihoods, in the extent of its accuracy tests, and in how it derives formulas for standard errors. Although the accuracy tests are simple and standard in statistical practice and in the for-profit field of credit-risk scoring, they have rarely been applied to poverty-assessment tools.

The scorecard (Figure 1) is based on the 2007 Household Survey conducted by Bolivia's *Instituto Nacional de Estadística* (INE). Indicators are selected to be:

- Inexpensive to collect, easy to answer quickly, and simple to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes

All points in the scorecard are zeroes or positive integers, and total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Non-specialists can collect data and tally scores on paper in the field in five to ten minutes.

The scorecard can be used to estimate three basic quantities. First, it can estimate a particular household's "poverty likelihood", that is, the probability that the household has per-capita income below a given poverty line.

Second, the scorecard can estimate the poverty rate of a group of households at a point in time. This is simply the average poverty likelihood among the households in the group.

Third, the scorecard can estimate changes in the poverty rate for a given group of households (or for two independent representative samples of households from the same population) between two points in time. This estimate is the change in the average poverty likelihood of the group(s) of households over time.

The scorecard can also be used for targeting services to poorer households. To help managers choose a targeting cut-off, this paper reports several measures of targeting accuracy for a range of possible cut-offs.

This paper presents a single scorecard whose indicators and points are derived from household income data and Bolivia's national poverty line. Scores from this scorecard are calibrated to poverty likelihoods for eight poverty lines.

The scorecard is constructed and calibrated using a sub-sample of the data from the 2007 Household Survey. Its accuracy is then validated on a different sub-sample

from the 2007 Household Survey as well as on the entire 2005 Household Survey. While all three scoring estimators are unbiased when applied to the population from which they were derived (that is, they match the true value on average in repeated samples from the same population from which the scorecard was built), they are—like all predictive models—biased to some extent when applied to a different population.[1]

Thus, while the indirect scoring approach is less costly than the direct survey approach, it is also biased in practice. (The direct survey approach is unbiased by definition.) There is bias because scoring must assume that the relationships between indicators and poverty in the future will be the same as in the data used to build the scorecard. It must also assume that these relationships will be the same in all sub-groups as in the population as a whole.[2] Of course, these assumptions—ubiquitous and inevitable in predictive modeling—hold only partly.

When applied to the 2007 validation sample for Bolivia with the national poverty line and $n = 16{,}384$, the difference between scorecard estimates of groups' poverty rates and the true rates at a point in time is –0.5 percentage points. Across all eight lines, the average absolute difference is 0.7 percentage points, and the maximum absolute difference is 1.2 percentage points. Because the 2007 validation sample is

[1] Examples of "different populations" include nationally representative samples at another point in time or non-representative sub-groups (Tarozzi and Deaton, 2007).
[2] Bias may also result from changes over time in the quality of data collection, from changes in the real value of poverty lines, from imperfect adjustment of poverty lines to account for differences in cost-of-living across time or geographic regions, or from sampling variation across surveys.

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representative of the same population as the data that was used to construct the scorecard and because all the data come from the same time frame, the scorecard estimators are unbiased and these observed differences are due to sampling variation; the average difference would be zero if the 2007 Household Survey were to be repeatedly redrawn and divided into sub-samples before repeating the entire scorecard-building and accuracy-testing process.

For $n = 16,384$, the 90-percent confidence intervals for these estimates are ±0.6 percentage points or less. For $n = 1,024$, these intervals are ±2.5 percentage points or less.

When the scorecard built from the 2007 construction and calibration samples is applied to both the 2007 validation sample and the entire 2005 Household Survey for the national line with $n = 16,384$ to measure change between two points in time, the difference between scorecard estimates and true values for changes in groups' poverty rates is +6.4 percentage points. Does this large difference mean that the scorecard is inaccurate? No; other evidence suggests that there are systematic, unreasonable, and unexplained changes in Bolivia's official poverty lines between 2005 and 2007 and that the scorecard estimate of a *large decrease* in poverty is probably closer to the truth than the official estimates of a *small increase* in poverty.

Section 2 below discusses this discrepancy in detail, and it also documents data, poverty rates, and poverty lines for Bolivia in general. Sections 3 and 4 describe scorecard construction and offer practical guidelines for use. Sections 5 and 6 detail the

estimation of households' poverty likelihoods and of groups' poverty rates at a point in time. Section 7 discusses estimating changes in poverty rates, and Section 8 covers targeting. Section 9 places the new scorecard here in the context of similar existing exercises for Bolivia. The final section is a summary.

2. Data and poverty lines

This section discusses the data used to construct and validate the scorecard. It also documents the poverty lines to which scores are calibrated. Finally, it discusses the large discrepancies between official, income-based estimates of changes in poverty rates between 2005 and 2007 and the scorecard's indicator-based estimates.

2.1   Data

The scorecard is based on data from the 4,148 households in Bolivia's 2007 Household Survey.[3] This is the best, most recent national income survey available for Bolivia. Households are randomly divided into three sub-samples (Figure 2):

- *Construction* for selecting indicators and points
- *Calibration* for associating scores with poverty likelihoods
- *Validation* for measuring accuracy on data not used in construction or calibration

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[3] In 2007, the average surveyed household represents 593 households. To prevent the breakdown of some bootstrap estimates (see Singh, 1998), 62 households who each represent 2000 households or more are omitted from all analysis for 2007, and 40 are likewise omitted for 2005. Furthermore, before random assignment to sub-samples, households representing more than 1,500 households were duplicated and their weights divided by two. Thus, the newly replicated pair of households together represent the same number of households as the original heavily weighted household. Replication helps spread heavily weighted households across the construction, calibration, and validation sub-samples, which in turn reduces the influence of any single heavily weighted household on scorecard construction, calibration, and validation. This does not affect the unbiasedness of scoring estimators, but it does improve precision.

In addition, the 4,086 households in the 2005 Household Survey are used in the validation of estimates of changes in poverty rates for two independent samples between two points in time.

2.2   Poverty rates and poverty lines

2.2.1 Rates

As a general definition, the *poverty rate* is the share of people in a given group who live in households whose total household income (divided by the number of members) is below a given poverty line.

Beyond this general definition, there two special cases, *household-level poverty rates* and *person-level poverty rates*. With household-level rates, each household is counted as if it had only one person, regardless of true household size, so all households are counted equally. With person-level rates (the "head-count index"), each household is weighted by the number of people in it, so larger households have greater weight.

For example, consider a group of two households, the first with one member and the second with two members. Suppose further that the first household has per-capita income above a poverty line (it is "non-poor") and that the second household has per-capita income below a poverty line (it is "poor"). The household-level rate counts both households as if they had only one person and so gives a poverty rate for the group of $1 \div (1 + 1) = 50$ percent. In contrast, the person-level rate weighs each household by the

number of people in it and so gives a poverty rate for the group of $2 \div (1 + 2) = 67$ percent.

Whether the household-level rate or the person-level rate is most relevant depends on the situation. If an organization's "participants" include all the people in a household, then the person-level rate is relevant. Governments, for example, are concerned with the well-being of their people, regardless of how those people are arranged in households, so governments typically report person-level poverty rates.

If an organization has only one "participant" per household, however, then the household-level rate is relevant. For example, if a microlender has only one borrower in a household, then it might want to report household-level poverty rates.

The scorecard here is constructed using Bolivia's 2007 Household Survey and household-level lines, scores are calibrated to household-level poverty likelihoods, and accuracy is measured for household-level rates. This use of household-level rates reflects the belief that they are the most relevant for most pro-poor organizations.

In any case, organizations can estimate person-level poverty rates by taking a household-size-weighted average of the household-level poverty likelihoods. It is also possible to construct a scorecard based on person-level lines, to calibrate scores to person-level likelihoods, and to measure accuracy for person-level rates, but it is not done here.

2.2.2 Poverty lines

Based on Bolivia's complete 2007 and 2005 Household Survey, Figure 3 reports poverty rates and poverty lines at both the household level and the person level. A single poverty line applies to all rural areas, while urban lines vary by department. The lines come from the Household Survey databases supplied by Bolivia's INE.

The derivation of Bolivia's official poverty lines begins with the cost (at median prices) of a food basket that varies by area. The basket provides an average minimum requirement for calories and protein based the distribution of people in an area by age, sex, and activity level.

The food poverty line (*línea de pobreza extrema*) is defined as the cost of the food basket plus the average non-food expenditure observed for households in an area in the Household Survey whose total expenditure (not food expenditure) falls within ±10 percentiles of the cost of the food basket. In other words, the food line is the cost of the food basket plus an observed non-food requirement. In 2007, the all-Bolivia poverty rate for the food line was 32.9 percent for households and 37.7 percent for people (Figure 3).

The national poverty line (here sometimes called "100% of the national line", corresponding to *la línea de pobreza moderada*) is the average total expenditure observed for households whose food expenditure falls within ±10 percentiles of the cost of the food basket. In 2007, the all-Bolivia poverty rate for the national line was 53.0 percent for households and 60.1 percent for people (Figure 3).

The above description represents the author's understanding of the definitions of the official food and national lines. It may be mistaken, as no documents explicitly define the poverty lines found in the databases for the 2005 and 2007 Household Surveys. Several documents describe methods for deriving poverty lines for Bolivia—including World Bank, 2005; Canavire Bacarreza, 2003; Jiménez, Lizárraga, and Canavire, 2003; Unidad de Análisis de Políticas Sociales y Económicas, 2003; Velencia *et al.*, 2003—but none of these cover Household Surveys after 2002. Furthermore, only World Bank (2005) reports a pattern of poverty lines (one for rural areas, and one by department for urban areas) that matches those in the INE-supplied databases, but World Bank (2005) does not report the method it used to derive its poverty lines. In private communication, Carlos Oyola and Gustavo Javier Canavire Bacerreza report that a single method has been used for the official lines since 2000.

Because local pro-poor organizations in Bolivia may want to use different or various poverty lines, this paper calibrates scores from its single scorecard to poverty likelihoods for eight lines:

- National
- Food
- 150% of national
- 200% of national
- USAID "extreme"
- USD1.25/day 2005 PPP
- USD2.50/day 2005 PPP
- USD3.75/day 2005 PPP

The 150-percent line and the 200-percent line are multiples of the national line.

The USAID "extreme" line is defined as the median income of people (not households) below the national line (U.S. Congress, 2002).

The USD1.25/day line (2005 PPP) is derived from:

- 2005 PPP exchange rate for "individual consumption expenditure by households" (International Comparison Project, 2008): BOB2.57 per $1.00
- Price deflators from the Banco Central de Bolivia:[4] 104.6220 for November/December 2005, 122.6344 for November/December 2007, and 102.8197 for 2005 on average

Using the formula in Sillers (2006), the USD1.25/day 2005 PPP line for Bolivia as a whole in November/December 2007 is:

$$(2005 \text{ PPP exchange rate}) \cdot \text{USD1.25} \cdot \frac{\text{CPI}_{\text{Nov./Dec. 2007}}}{\text{CPI}_{\text{Ave. 2005}}} =$$

$$\left(\frac{\text{BOB2.57}}{\text{USD1.00}}\right) \cdot \text{USD1.25} \cdot \frac{122.6344}{102.8197} = \text{BOB3.83.}$$

The 2005 all-Bolivia USD1.25/day 2005 PPP line (BOB3.27) is computed in the same way. The USD2.50/day line and the USD3.75/day line are multiples of the USD1.25/day line.

The 2005 PPP lines above apply to Bolivia as a whole. These are adjusted for differences in cost-of-living by area as implicitly reflected in the 2005 and 2007 national poverty lines using:

- L, a given national-level PPP poverty line
- I, index to n poverty-line areas
- p_i, population proportion for each poverty-line area
- π_i, national poverty line by urban/rural

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[4] www.bcb.gov.bo/index.php?q=indicadores/inflacion, accessed 2 December 2009.

The cost-of-living-adjusted poverty line for an area L_i in a survey year is:

$$L_i = \frac{L \cdot \pi_i}{\sum_{j=1}^{n} p_j \cdot \pi_j}.$$

The all-Bolivia poverty lines L in Figure 3 are the household- or person-weighted averages of the area-specific lines L_i, with the differences in the lines reflecting differences in the cost of living across areas.

2.3   Inconsistent changes in poverty rates, 2005–2007

In 2005–2007, poverty rates for the five lines based on Bolivia's official lines (food, national, 150% of national, 200% of national, and the USAID "extreme" line), did not change by more than about ±1.0 percentage points (Figures 2 and 3).[5] In contrast, poverty rates for all three 2005 PPP lines decreased sharply, by 5 to 7 percentage points.

These two sets of results are inconsistent. For example, the 2007 food line is BOB7.85/person/day, almost the same as the 2007 USD2.50/day 2005 PPP line of BOB7.66 (Figure 3). Yet the food poverty rate increased by +0.2 percentage points, while the USD2.50/day rate decreased by –5.4 percentage points.

This is because, from 2005 to 2007, the food line—like the other four lines derived from official lines—increases by 30 percent or more, while the 2005 PPP lines

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[5] Figure 2 shows poverty rates after deleting the most heavily weighted cases and breaking up other heavily weighted cases. But all the discussion in this section holds even if the full samples are used (as they are in Figure 3).

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increase by 17 percent (Figure 3). Given that the change in the all-Bolivia consumer

price index (CPI) between the earlier survey in November/December 2005 (104.6220)

and the later survey in November/December 2007 (122.6344) is about 17 percent, it

seems that, for some unknown reason, the adjustment in the official lines for changes

between 2005 and 2007 is somehow off. Without an explanation for the incompatibility,

scorecard users would be wise to focus on the 2005 PPP lines.

Other data from the Household Surveys also suggest that the official poverty

lines are off: the values of eight of ten scorecard indicators (Figure 1) show large

changes pointing in the direction of reduced poverty. In particular:

- The average number of household members decreased (average category changed from 3.06 to 3.10, where A corresponds to 1, B corresponds to 2, etc.)
- School attendance fell (average category from 1.13 to 1.10, the first exception)
- Type of floor improved (average category from 0.75 to 0.83)
- Type of cooking fuel improved (from 0.51 to 0.68)
- Refrigerator ownership improved (from 32 to 39 percent)
- Dining-room set ownership was unchanged (the second exception)
- Television-set ownership improved (from 63 to 72 percent)
- VCR/DVD ownership improved (from 24 to 38 percent)
- Stereo/hi-fi ownership improved (from 24 to 27 percent)
- Blue-collar or white-collar employment improved (from 43 to 47 percent)

In sum, both the 2005 PPP poverty lines and easy-to-measure non-financial

indicators point to sharp reductions in poverty. The small changes in official poverty

rates between 2005 and 2007 seem to be due to unexplained changes in the adjustment

of poverty lines across time that cannot be reconciled with Bolivia's overall CPI.

3. Scorecard construction

For the Bolivia scorecard, about 90 potential indicators are initially prepared in the areas of:

- Family composition (such as household size)
- Education (such as school attendance of children)
- Employment (such as number of blue-collar or white-collar employees)
- Housing (such as the main construction material of the floors)
- Ownership of durable goods (such as televisions or refrigerators)

Figure 4 lists all the candidate indicators, ranked by the entropy-based "uncertainty coefficient" that is a measure of how well the indicator predicts poverty on its own (Goodman and Kruskal, 1979). Responses for each indicator in Figure 4 are ordered starting with those most strongly linked with higher poverty likelihoods.

The scorecard also aims to measure *changes* in poverty through time. This means that, when selecting indicators and holding other considerations constant, preference is given to more sensitive indicators. For example, ownership of a television is probably more likely to change in response to changes in poverty than is the age of the male head/spouse.

The scorecard itself is built using the national poverty line and Logit regression on the construction sub-sample. Indicator selection uses both judgment and statistics (forward stepwise, based on "c"). The first step is to use Logit to build one scorecard for each candidate indicator. Each scorecard's accuracy is taken as "c", a measure of ability to rank by poverty status (SAS Institute Inc., 2004).

One of these one-indicator scorecards is then selected based on several factors (Schreiner *et al.*, 2004; Zeller, 2004), including improvement in accuracy, likelihood of acceptance by users (determined by simplicity, cost of collection, and "face validity" in terms of experience, theory, and common sense), sensitivity to changes in poverty status, variety among indicators, and verifiability.

A series of two-indicator scorecards are then built, each based on the one-indicator scorecard selected from the first step, with a second candidate indicator added. The best two-indicator scorecard is then selected, again based on "c" and judgment. These steps are repeated until the scorecard has 10 indicators.

This algorithm is the Logit analogue to the familiar R^2-based stepwise with least-squares regression. It differs from naïve stepwise in that the criteria for selecting indicators include not only statistical accuracy but also judgment and non-statistical factors. The use of non-statistical criteria can improve robustness through time and helps ensure that indicators are simple and make sense to users.

The final step is to transform the Logit coefficients into non-negative integers such that total scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line).

The single scorecard here applies to all of Bolivia. Tests for Mexico and India (Schreiner, 2006b and 2006c), Sri Lanka (Narayan and Yoshida, 2005), and Jamaica (Grosh and Baker, 1995) suggests that segmenting scorecards by urban/rural does not

improve targeting much, although such segmentation may improve the accuracy of estimated poverty rates (Tarozzi and Deaton, 2007).

4. Practical guidelines for scorecard use

The main challenge of scorecard design is not to squeeze out the last drops of accuracy but rather to improve the chances that scoring is actually used (Schreiner, 2005). When scoring projects fail, the reason is not usually technical inaccuracy but rather the failure of an organization to decide to do what is needed to integrate scoring in its processes and to learn to use it properly (Schreiner, 2002). After all, most reasonable scorecards predict tolerably well, thanks to the empirical phenomenon known as the "flat maximum" (Falkenstein, 2008; Hand, 2006; Baesens *et al.*, 2003; Lovie and Lovie, 1986; Kolesar and Showers, 1985; Stillwell, Barron, and Edwards, 1983; Dawes, 1979; Wainer, 1976; Myers and Forgy, 1963). The bottleneck is less technical and more human, not statistics but organizational change management. Accuracy is easier to achieve than adoption.

The scorecard here is designed to encourage understanding and trust so that users will want to adopt it and use it properly. Of course, accuracy is important, but so are simplicity, ease-of-use, and "face validity". Programs are more likely to collect data, compute scores, and pay attention to the results if, in their view, scoring does not make a lot of "extra" work and if the whole process generally seems to make sense.

To this end, the scorecard here fits on a single page. The construction process, indicators, and points are simple and transparent. "Extra" work is minimized; non-specialists can compute scores by hand in the field because the scorecard has:

- Only 10 indicators
- Only categorical indicators
- Simple weights (non-negative integers, and no arithmetic beyond addition)

A field worker using the paper scorecard would:

- Record participant identifiers
- Read each question from the scorecard
- Circle each response and its points
- Write the points in the far-right column
- Add up the points to get the total score
- Implement targeting policy (if any)
- Deliver the paper scorecard to a central office for data entry and filing

4.1   Quality control

Of course, field workers must be trained. High-quality outputs require high-quality inputs. If organizations or field workers gather their own data and if they believe that they have an incentive to exaggerate poverty rates (for example, if funders reward them for higher poverty rates), then it is wise to do on-going quality control via data review and random audits (Matul and Kline, 2003).[6] IRIS Center (2007a) and Toohig (2008) are useful nuts-and-bolts guides for planning, budgeting, training field

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[6] If an organization does not want field workers to know the points associated with indicators, then they can use the version of Figure 1 without points and apply the points later in a spreadsheet or database at the central office.

workers and supervisors, logistics, sampling, interviewing, piloting, recording data, and controlling quality.

In particular, while collecting scorecard indicators is relatively easier than most alternatives, it is still absolutely difficult. Training and explicit definitions of terms and concepts in the scorecard is essential.[7] For the example of Nigeria, one study finds distressingly low inter-rater and test-retest correlations for indicators as seemingly simple and obvious as whether the household owns an automobile (Onwujekwe, Hanson, and Fox-Rushby, 2006).

For the first stage of targeting in Mexico's *Oportunidades* conditional cash-transfer program, Martinelli and Parker (2007) find that "underreporting [of asset ownership] is widespread but not overwhelming, except for a few goods . . . [and] overreporting is common for a few goods, which implies that self-reporting may lead to the exclusion of deserving households" (pp. 24–25). Still, as *Oportunidades* does in the second stage of its targeting process, field agents can verify responses with a home visit and correct false reports, and this is the suggested procedure for the scorecard as well.

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[7] Appendix A is a guide for interpreting the indicators in Bolivia's scorecard.

4.2   Implementation and sampling

In terms of implementation and sample design, an organization must make

choices about:

- Who will do the scoring
- How scores will be recorded
- What participants will be scored
- How many participants will be scored
- How frequently participants will be scored
- Whether scoring will be applied at more than one point in time
- Whether the same participants will be scored at more than one point in time

The non-specialists who apply the scorecard with participants in the field can be:

- Employees of the organization
- Third-party contractors

Responses, scores, and poverty likelihoods can be recorded:

- On paper in the field and then filed at an office
- On paper in the field and then keyed into a database or spreadsheet at an office
- On portable electronic devices in the field and then downloaded to a database

The subjects to be scored can be:

- All participants
- A representative sample of all participants
- All participants in a representative sample of branches
- A representative sample of all participants in a representative sample of branches

If not determined by other factors, the number of participants to be scored can

be derived from sample-size formulas (presented later) for a desired confidence level and

a desired confidence interval.

Frequency of application can be:

- At in-take of new clients only (precluding measuring change in poverty rates)
- As a once-off project for current participants (precluding measuring change)
- Once a year or at some other fixed time interval (allowing measuring change)
- Each time a field worker visits a participant at home (allowing measuring change)

When the scorecard is applied more than once in order to measure changes in

poverty rates, it can be applied:

- With different sets of participants, with each set representative of all participants
- With a single set of participants

An example of implementation and design choices is provided by BRAC and

ASA, two microlenders in Bangladesh (each with more than 7 million participants) who

are applying the Simple Poverty Scorecard tool for Bangaldesh (Chen and Schreiner,

2009a). Their design is that loan officers in a random sample of branches score all their

clients each time they visit a homestead (about once a year) as part of their standard

due diligence prior to loan disbursement. Responses in the field are recorded on paper

before being sent to a central office to be entered into a database. The sampling plans

of ASA and BRAC cover 50,000–100,000 participants each (far more than would be

required to inform most relevant decisions at a typical pro-poor organization).

5. Estimates of household poverty likelihoods

The sum of scorecard points for a household is called the *score*. For Bolivia, scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). While higher scores indicate less likelihood of being below a poverty line, the scores themselves have only relative units. For example, doubling the score does not double the likelihood of being above a poverty line.

To get absolute units, scores must be converted to *poverty likelihoods*, that is, probabilities of being below a poverty line. This is done via simple look-up tables. For the example of the national line with the 2007 Household Survey, scores of 45–49 have a poverty likelihood of 52.5 percent, and scores of 50–54 have a poverty likelihood of 39.3 percent (Figure 5).

The poverty likelihood associated with a score varies by poverty line. For example, scores of 45–49 are associated with a poverty likelihood of 52.5 percent for the national line but 19.5 percent for the food line.[8]

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[8] Starting with Figure 5, many figures have 16 versions, one for each of the eight poverty lines for the 2007 scorecard applied to the 2007 validation sample, and one for each of the eight poverty lines for the 2007 scorecard applied to the 2005 Household Survey. The tables are grouped by poverty line and by the data used for validation. Single tables that pertain to all poverty lines and/or years are placed with the tables for the national line and the 2007 validation sample.

5.1 Calibrating scores with poverty likelihoods

A given score is non-parametrically associated ("calibrated") with a poverty likelihood by defining the poverty likelihood as the share of households in the calibration sub-sample who have the score and who are below a given poverty line.

For the example of the national line (Figure 6), there are 9,171 (normalized) households in the calibration sub-sample with a score of 45–49, of whom 4,813 (normalized) are below the poverty line. The estimated poverty likelihood associated with a score of 45–49 is then 52.5 percent, as 4,813 ÷ 9,171 = 52.5 percent.

To illustrate further with the national line and a score of 50–54, there are 10,349 (normalized) households in the calibration sample, of whom 4,064 (normalized) are below the line (Figure 6). Thus, the poverty likelihood for this score is 4,064 ÷ 10,349 = 39.3 percent.

The same method is used to calibrate scores with estimated poverty likelihoods for all eight poverty lines.

Figure 7 shows, for all scores, the likelihood that income falls in a range

demarcated by two adjacent poverty lines. For example, the daily income of someone

with a score of 45–49 falls in the following ranges with probability:

- 4.8 percent   below the $1.25/day 2005 PPP line
- 16.7 percent   between the $1.25/day 2005 PPP and the USAID "extreme" lines
- 0.0 percent   between the USAID "extreme" and the $2.50/day 2005 PPP lines
- 0.0 percent   between the $2.50/day 2005 PPP and the food lines
- 13.1 percent   between the food and the $3.75/day 2005 PPP lines
- 17.9 percent   between the $3.75/day 2005 PPP and the national lines
- 24.7 percent   between the national and 150% of the national lines
- 5.7 percent   between 150% and 200% of the national lines
- 17.1 percent   above 200% of the national line

Even though the scorecard is constructed partly based on judgment, this

calibration process produces poverty likelihoods that are objective, that is, derived from

survey data on income and quantitative poverty lines. The poverty likelihoods would be

objective even if indicators and/or points were selected without any data at all. In fact,

objective scorecards of proven accuracy are often based only on judgment (Fuller, 2006;

Caire, 2004; Schreiner *et al.*, 2004). Of course, the scorecard here is constructed with

both data and judgment. The fact that this paper acknowledges that some choices in

scorecard construction—as in any statistical analysis—are informed by judgment in no

way impugns the objectivity of the poverty likelihoods, as this depends on using data in

score calibration, not on using data (and nothing else) in scorecard construction.

Although the points in Bolivia's scorecard are transformed coefficients from a

Logit regression, scores are not converted to poverty likelihoods via the Logit formula of

$2.718281828^{\text{score}}$ x $(1 + 2.718281828^{\text{score}})^{-1}$. This is because the Logit formula is esoteric and

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difficult to compute by hand. Non-specialists find it more intuitive to define the poverty likelihood as the share of households with a given score in the calibration sample who are below a poverty line. In the field, converting scores to poverty likelihoods requires no arithmetic at all, just a look-up table. This non-parametric calibration can also improve accuracy, especially with large calibration samples.

5.2   Accuracy of estimates of households' poverty likelihoods

As long as the relationship between indicators and poverty does not change and as long as the scorecard is applied to households who are representative of the same population from which the scorecard was constructed, this calibration process produces unbiased estimates of poverty likelihoods. *Unbiased* means that in repeated samples from the same population, the average estimate matches the true poverty likelihood. The scorecard also produces unbiased estimates of poverty rates at a point in time, as well as unbiased estimates of changes in poverty rates between two points in time.[9]

The relationship between indicators and poverty does change with time and also across sub-groups in Bolivia's population, so the scorecard will generally be biased when applied after the end date of fieldwork for the 2007 Household Survey (as it must be applied in practice) or when applied with non-nationally representative groups (as it probably would be applied by local, pro-poor organizations).

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[9] This follows because these estimates of groups' poverty rates are linear functions of the unbiased estimates of households' poverty likelihoods.

How accurate are estimates of households' poverty likelihoods, given the assumption of representativeness? To check, the scorecard is applied to 1,000 bootstrap samples of size $n = 16{,}384$ from the 2007 validation sub-sample. Bootstrapping entails (Efron and Tibshirani, 1993):

- Score each household in the validation sample
- Draw a new bootstrap sample *with replacement* from the validation sample
- For each score, compute the true poverty likelihood in the bootstrap sample, that is, the share of households with the score who have income below a poverty line
- For each score, record the difference between the estimated poverty likelihood (Figure 5) and the true poverty likelihood in the bootstrap sample
- Repeat the previous three steps 1,000 times
- For each score, report the average difference between estimated and true poverty likelihoods across the 1,000 bootstrap samples
- For each score, report the two-sided interval containing the central 900, 950, or 990 differences between estimated and true poverty likelihoods

For each score range and for $n = 16{,}384$, Figure 8 shows the average difference between estimated and true poverty likelihoods as well as confidence intervals for the differences.

For the national line in the 2007 validation sample, the average poverty likelihood across bootstrap samples for scores of 45–49 is too low by 0.1 percentage points (Figure 8). For scores of 50–54, the estimate is too high by 5.0 percentage points.[10]

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[10] These differences are not zero, despite the estimator's unbiasedness, because the scorecard comes from a single sample. The average difference by score would be zero if samples were repeatedly drawn from the population and split into sub-samples before repeating the entire construction and calibration process.

The 90-percent confidence interval for the differences for scores of 45–49 is ±2.4 percentage points (Figure 8). This means that in 900 of 1,000 bootstraps, the difference between the estimate and the true value is between –2.5 and +2.3 percentage points (because –0.1 – 2.4 = –2.5, and –0.1 + 2.4 = +2.3). In 950 of 1,000 bootstraps (95 percent), the difference is –0.1 ±2.9 percentage points, and in 990 of 1,000 bootstraps (99 percent), the difference is –0.1 ±4.1 percentage points.

For almost all scores below 80, Figure 8 shows differences—some of them large—between estimated poverty likelihoods and true values. This is because the validation sub-sample is a single sample that—thanks to sampling variation—differs in distribution from the construction/calibration sub-samples and from Bolivia's population. When the 2007 scorecard is applied to the 2005 Household Survey, differences are due mostly to changes in the relationships between indicators and poverty over time (or, in the case of Bolivia, unexplained adjustments for changes in cost-of-living for the official lines). For targeting, however, what matters is less the differences across all score ranges and more the differences in score ranges just above and below the targeting cut-off. This mitigates the effects of bias and sampling variation on targeting (Friedman, 1997). Section 8 below looks at targeting accuracy in detail.

Of course, if estimates of groups' poverty rates are to be usefully accurate, then errors for individual households must largely cancel each other out. This is generally the case, especially for the 2007 validation sub-sample, as discussed in the next section.

Another possible source of bias is overfitting. By construction, the scorecard here is unbiased, but it may still be *overfit* when applied after the December 2007 end of field work for the 2007 Household Survey. That is, the scorecard may fit the data from the 2007 Household Survey so closely that it captures not only some real patterns but also some random patterns that, due to sampling variation, show up only in the 2007 Household Survey. Or the scorecard may be overfit in the sense that it becomes biased as the relationships between indicators and poverty change through time. Finally, the scorecard could also be overfit when it is applied to samples from non-nationally representative sub-groups.

Overfitting can be mitigated by simplifying the scorecard and by not relying only on data but rather also considering experience, judgment, and theory. Of course, the scorecard here does this. Bootstrapping scorecard construction—which is not done here—can also mitigate overfitting by reducing (but not eliminating) dependence on a single sampling instance. Combining scorecards can also help, at the cost of complexity.

In any case, most errors in individual households' likelihoods cancel out in the estimates of groups' poverty rates (see later sections). Furthermore, much of the differences between scorecard estimates and true values may come from non-scorecard sources such as changes in the relationship between indicators and poverty, sampling variation, changes in poverty lines, inconsistencies in data quality across time, and inconsistencies/imperfections in cost-of-living adjustments across time and space. These factors can be addressed only by improving data quantity and quality (which is beyond

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the scope of the scorecard), by updating data, or by reducing overfitting (which likely

has limited returns, given the scorecard's parsimony).

6. Estimates of a group's poverty rate at a point in time

A group's estimated poverty rate at a point in time is the average of the estimated poverty likelihoods of the individual households in the group.

To illustrate, suppose a program samples three households on Jan. 1, 2009 and that they have scores of 20, 30, and 40, corresponding to poverty likelihoods of 84.8, 82.3, and 65.8 percent (national line, Figure 5). The group's estimated poverty rate is the households' average poverty likelihood of $(84.8 + 82.3 + 65.8) \div 3 = 77.6$ percent.[11]

6.1   Accuracy of estimated poverty rates at a point in time

How accurate is this estimate? For a range of sample sizes, Figure 10 reports average differences between estimated and true poverty rates as well as precision (confidence intervals for the differences) for the Bolivia scorecard applied to 1,000 bootstrap samples from the 2007 validation sample and from the 2007 Household Survey.

Summarizing Figure 10 across poverty lines and years for $n = 16{,}384$, Figure 9 shows that the absolute differences between the estimated poverty rate and the true rate for the 2007 scorecard applied to the 2007 validation sample are 1.2 percentage

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[11] The group's poverty rate is *not* the poverty likelihood associated with the average score. Here, the average score is $(20 + 30 + 40) \div 3 = 30$, and the poverty likelihood associated with the average score is 82.3 percent. This is not the 77.6 percent found as the average of the three poverty likelihoods associated with each of the three scores.

points or less. The average absolute difference across the eight poverty lines for the 2007 validation sample is 0.7 percentage points.

In terms of precision, the 90-percent confidence interval for a group's estimated poverty rate at a point in time in 2005 or 2007 with $n = 16,384$ and for all poverty lines is ±0.6 percentage points or less (Figure 9). This means that in 900 of 1,000 bootstraps of this size, the absolute difference between the estimate and the average estimate is 0.6 percentage points or less.

In the specific case of the national line and the 2007 validation sample, 90 percent of all samples of $n = 16,384$ produce estimates that differ from the true value in the range of $-0.5 + 0.5 = 0.0$ to $-0.5 - 0.5 = -1.0$ percentage points. This is because -0.5 is the average difference and ±0.5 is its 90-percent confidence interval. The average difference is -0.5 because the average scorecard estimate is too low by 0.5 percentage points; it tends to estimate a poverty rate of 54.0 percent for the 2007 validation sample, but the true value is 54.5 percent (Figure 2).

The differences between estimates and true values are much larger for the 2007 scorecard applied to the 2005 Household Survey (Figure 9). Part of these differences is due to sampling variation across survey rounds and in the division of the 2007 Household Survey into three sub-samples, as well as small design differences across Household Survey rounds. Some differences are due to changes in the relationships between indicators and poverty over time. This suggests that estimates of poverty rates at a point in time will be most accurate for periods that resemble 2007. As discussed

earlier, the large differences between estimates and true values for Bolivia's official poverty lines and the small differences between estimates and true values for the 2005 PPP poverty lines suggests some sort of unexplained inconsistency in the cost-of-living adjustments for the official lines.

For the Bolivia scorecard based on the 2007 Household Survey applied to the 2005 Household Survey with $n = 16{,}384$, the differences at a point in time for the poverty lines derived from official lines are large, ranging from $+4.9$ to $+7.9$ percentage points. In contrast, the differences for the 2005 PPP lines are small, ranging from -0.6 to $+1.8$ percentage points. For all lines, the 90-percent confidence intervals are ± 0.6 percentage points or less. Future accuracy will depend on how closely the next few years resemble 2007.

6.2 Standard-error formula for estimates of poverty rates at a point in time

How precise are the point-in-time estimates? Because they are averages, the estimates have a Normal distribution and can be characterized by their average difference vis-à-vis true values, along with the standard error of the average difference.

To derive a formula for the standard errors of estimated poverty rates at a point in time for indirect measurement via poverty-assessment tools (Schreiner, 2008a), note that the textbook formula (Cochran, 1977) that relates confidence intervals with standard errors in the case of direct measurement of poverty rates is $c = +/- z \cdot \sigma$, where:

c is a confidence interval as a proportion (*e.g.*, 0.02 for ± 2 percentage points),

z is from the Normal distribution and is $\begin{cases} 1.64 \text{ for confidence levels of 90 percent} \\ 1.96 \text{ for confidence levels of 95 percent} \\ 2.58 \text{ for confidence levels of 99 percent} \end{cases}$,

σ is the standard error of the estimated poverty rate, that is, $\sqrt{\dfrac{p \cdot (1-p)}{n}}$,

p is the proportion of households below the poverty line in the sample, and

n is the sample size.

For example, with a sample $n = 16{,}384$, 90-percent confidence ($z = 1.64$), and a poverty rate p of 54.5 percent (the true rate in the 2007 validation sample for the national line in Figure 2), the confidence interval c is

$$+/- z \cdot \sqrt{\frac{p \cdot (1-p)}{n}} = +/- 1.64 \cdot \sqrt{\frac{0.545 \cdot (1 - 0.545)}{16{,}384}} = \pm 0.638 \text{ percentage points.}$$

Scorecards, however, do not measure poverty directly, so this formula is not applicable. To derive a formula for the Bolivia scorecard, consider Figure 10, which reports empirical confidence intervals c for the differences for the scorecard applied to 1,000 bootstrap samples of various sample sizes from a validation sample. For $n =$

16,384, the national line, and the 2007 validation sub-sample, the 90-percent confidence

interval is ±0.535 percentage points.[12] Thus, the ratio of confidence intervals with the

scorecard and with direct measurement is $0.535 \div 0.638 = 0.84$.

Now consider the same case, but with $n = 8{,}192$. The confidence interval under

direct measurement is $+/-1.64 \cdot \sqrt{\dfrac{0.545 \cdot (1 - 0.545)}{8{,}192}} = \pm 0.902$ percentage points. The

empirical confidence interval with the Bolivia scorecard for the national line (Figure 10)

is ±0.780 percentage points. Thus for $n = 8{,}192$, the ratio is $0.780 \div 0.902 = 0.86$.

This ratio of 0.86 for $n = 8{,}192$ is not far from the ratio of 0.84 for $n = 16{,}384$.

Indeed, across all sample sizes of 256 or more in Figure 10, the average ratio turns out

to be 0.85, implying that confidence intervals for indirect estimates of poverty rates via

the Bolivia scorecard and this poverty line are about 15 percent narrower than those for

direct estimates. This 0.85 appears in Figure 9 as the "α factor" because if α = 0.85,

then the formula relating confidence intervals c and standard errors σ for the Bolivia

scorecard is $c = +/- z \cdot \alpha \cdot \sigma$. The standard error σ for point-in-time estimates of

poverty rates via scoring is $\alpha \cdot \sqrt{\dfrac{p \cdot (1 - p)}{n}}$.

In general, α could be more or less than 1.00. When α is less than 1.00, it means

that the scorecard is more precise than direct measurement. This occurs in most of the

cases in Figure 9.

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[12] Due to rounding, Figure 10 displays 0.5, not 0.535.

The formula relating confidence intervals to standard errors for the scorecard can be rearranged to give a formula for determining sample size n before measurement.[13] If $\hat{p}$ is the expected poverty rate before measurement, then the formula for n based on the desired confidence level that corresponds to z and the desired confidence interval $\pm c$ under the scorecard is $n = \left(\dfrac{\alpha \cdot z}{c}\right)^2 \cdot \hat{p} \cdot (1 - \hat{p})$.

To illustrate how to use this, suppose $c = 0.04375$ and $z = 1.64$ (90-percent confidence), and $\hat{p} = 0.535$ (the average poverty rate for the national line in the 2007 construction and calibration sub-samples, Figure 2). Then the formula gives

$n = \left(\dfrac{0.85 \cdot 1.64}{0.04375}\right)^2 \cdot 0.535 \cdot (1 - 0.535) = 253$, close to the sample size of 256 observed for

these parameters in Figure 10.

Of course, the α factors in Figure 9 are specific to Bolivia, its poverty lines, its poverty rates, and this scorecard. The method for deriving the formulas, however, is valid for any poverty-assessment tool following the approach in this paper.

In practice after the end of the Household Survey's field work in December 2007, an organization would select a poverty line (say, the national line), select a desired confidence level (say, 90 percent, or $z = 1.64$), select a desired confidence interval (say,

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[13] IRIS Center (2007a and 2007b) says that a sample size of $n = 300$ is sufficient for reporting estimated poverty rates to USAID. If a scorecard is as precise as direct measurement, if the expected (before measurement) poverty rate is 50 percent, and if the confidence level is 90 percent, then $n = 300$ implies a confidence interval of ± 2.2 percentage points. In fact, USAID has not specified confidence levels or intervals. Furthermore, the expected poverty rate may not be 50 percent, and the scorecard could be more or less precise than direct measurement.

± 2.0 percentage points, or $c = 0.02$), make an assumption about $\hat{p}$ (perhaps based on a previous measurement such as the 53.9 percent average for the national line in the 2007 Household Survey in Figure 2), look up α (here, 0.85), assume that the scorecard will still work in the future and/or for non-nationally representative sub-groups,[14] and then compute the required sample size. In this illustration,

$$n = \left(\frac{0.85 \cdot 1.64}{0.02} \right)^2 \cdot 0.539 \cdot (1 - 0.539) = 1{,}208.$$

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[14] This paper reports accuracy for the scorecard applied to the 2007 validation sample and to the 2005 Household Survey, but it cannot test accuracy for later years or for other groups. Performance will deteriorate with time to the extent that the relationship between indicators and poverty changes.

7. Estimates of changes in group poverty rates over time

The change in a group's poverty rate between two points in time is estimated as the change in the average poverty likelihood of the households in the group.

7.1 Warning: Change is not impact

Scoring can estimate change. Of course, change could be for the better or for the worse, and scoring does not indicate what caused change. This point is often forgotten, confused, or ignored, so it bears repeating: the scorecard simply estimates change, and it does not, in and of itself, indicate the reason for the change. In particular, estimating the impact of program participation on poverty status requires knowing what would have happened to participants if they had not been participants. Knowing this requires either strong assumptions or a control group that resembles participants in all ways except participation. To belabor the point, the scorecard can help estimate program impact only if there is some way to know what would have happened in the absence of the program. And that information must come from somewhere beyond the scorecard.

7.2 Calculating estimated changes in poverty rates over time

Consider the illustration begun in the previous section. On Jan. 1, 2009, a program samples three households who score 20, 30, and 40 and so have poverty likelihoods of 84.8, 82.3, and 65.8 percent (national line, Figure 5). The group's baseline

estimated poverty rate is the households' average poverty likelihood of (84.8 + 82.3 +

65.8) ÷ 3 = 77.6 percent.

After baseline, two sampling approaches are possible for the follow-up round:

- Score a new, independent sample, measuring change by cohort across samples
- Score the same sample at follow-up as at baseline

By way of illustration, suppose that a year later on Jan. 1, 2010, the program

samples three additional households who are in the same cohort as the three households

originally sampled (or suppose that the program scores the same three original

households a second time) and finds that their scores are now 25, 35, and 45 (poverty

likelihoods of 71.5, 74.1, and 52.5 percent, national line, Figure 5). Their average

poverty likelihood at follow-up is (71.5 + 74.1 + 52.5) ÷ 3 = 66.0 percent, an

improvement of 77.6 − 66.0 = 11.6 percentage points.[15]

This suggests that about one of nine participants crossed the poverty line in

2009. (This is a net figure; some people start above the line and end below it, and vice

versa.) Among those who started below the line, about one in seven (11.6 ÷ 77.6 = 14.9

percent) ended up above the line. Of course, the scorecard does not reveal the reasons

for this change.

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[15] Of course, such a huge reduction in poverty is unlikely in a year's time, but this is just an example to show how the scorecard can be used to estimate change.

7.3 Estimated changes in poverty rates in Bolivia

Given the Bolivia scorecard built from the construction and calibration samples of the 2007 Household Survey, an estimate of the change in the poverty rate is the difference between the estimated poverty rate in the 2007 validation sample and the estimated poverty rate in the 2005 Household Survey.

In Figure 11 (summarizing Figure 12 across poverty lines), the difference between this estimate and the true value for the national line is +6.4 percentage points. As discussed earlier, this large difference—and the other similarly inaccurate estimates for poverty lines based on the official lines—probably reflects price adjustments that are too large, relative to the change in Bolivia's CPI.

For poverty lines based on 2005 PPP, the scorecard estimates sharp reductions in poverty (about –4 percentage points), and these match the true changes well, with an average absolute difference of 0.9 percentage points.

In terms of precision, the 90-percent confidence interval for all poverty lines is ±0.8 percentage points or less (Figure 11).

Because the scorecard estimate is unbiased, these differences are due to sampling variation, changes in data collection, changes in the relationship between indicators and poverty and—especially—changes in poverty lines. The size of the differences here—at least for the lines based on Bolivia's official lines—is far greater than in other tests (Schreiner 2009a, 2009b, 2009c, and 2008b; Chen and Schreiner, 2009a and 2009b;

Mathiassen, 2008). The differences for the 2005 PPP lines, however, are in line with other tests, suggesting again that the official poverty lines are somehow off.

7.4 Accuracy for estimated change in two independent samples

For two equal-sized independent samples, the same logic as in the previous section can be used to derive a formula relating the confidence interval c with the standard error σ of a poverty-assessment tool's estimate of the change in poverty rates over time:

$$c = +/- z \cdot \sigma = +/- z \cdot \alpha \cdot \sqrt{\frac{2 \cdot p \cdot (1 - p)}{n}} \ .$$

z, c, and p are defined as above, n is the sample size at both baseline and follow-up,[16] and α is the average (across a range of bootstrapped sample sizes) of the ratio of the observed confidence intervals from a scorecard and the theoretical confidence intervals from the textbook formula for direct measurement for two equal-sized independent samples. All the α factors for Bolivia exceed 1.00 (Figure 11), so scoring for this purpose is less precise than direct measurement, usually on the order of 30 to 40 percent.

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[16] This means that, for a given precision and with direct measurement, estimating the change in a poverty rate over time requires four times as many measurements (not twice as many) as does estimating a poverty rate at a point in time.

The formula for standard errors can be rearranged to give a formula for sample sizes before indirect measurement via a scorecard, where $\hat{p}$ is based on previous measurements and is assumed equal at both baseline and follow-up:

$$n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \hat{p} \cdot (1 - \hat{p}).$$

To illustrate the use of the formula above to determine sample size for estimating changes in poverty rates across two independent samples from 2005 and 2007, suppose the desired confidence level is 90 percent ($z = 1.64$), the desired confidence interval is 2 percentage points ($c = 0.02$), the poverty line is the national line, $\alpha = 1.26$ (from Figure 11), and $\hat{p} = 0.539$ (from Figure 2). Then the baseline sample size is

$n = 2 \cdot \left(\frac{1.26 \cdot 1.64}{0.02} \right)^2 \cdot 0.539 \cdot (1 - 0.539) = 5{,}306$, and the follow-up sample is also 5,306.

7.5   Accuracy for estimated change for one sample, scored twice

The general formula relating the confidence interval c to the standard error σ when using scoring to estimate change for a single group of households, all of whom are scored at two points in time, is:[17]

$$c = +/- z \cdot \sigma = +/- z \cdot \alpha \cdot \sqrt{\frac{p_{12} \cdot (1 - p_{12}) + p_{21} \cdot (1 - p_{21}) + 2 \cdot p_{12} \cdot p_{21}}{n}}.$$

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[17] See McNemar (1947) and Johnson (2007). John Pezzullo helped find this formula.

z, c, and α are defined as before, p_{12} is the share of all sampled households that move from below the poverty line to above it, and p_{21} is the share of all sampled households that move from above the line to below it.

As usual, the formula for σ can be rearranged to give a formula for sample size n before measurement. This requires an estimate (based on information available before measurement) of the expected shares of all households who cross the poverty line $\hat{p}_{12}$ and $\hat{p}_{21}$. Before measurement, it is reasonable to assume that the overall change in the poverty rate will be zero, which implies $\hat{p}_{12} = \hat{p}_{21} = \hat{p}_*$, giving:

$$ n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \hat{p}_* . $$

$\hat{p}_*$ could be anything between 0–1, so more information is needed before applying this formula. Suppose that the observed relationship between $\hat{p}_*$, the number of years y between baseline and follow-up, and $p_{\text{baseline}} \cdot (1 - p_{\text{baseline}})$ is—as in Peru (Schreiner, 2009a)—close to:

$$ \hat{p}_* = -0.02 + 0.016 \cdot y + 0.47 \cdot [p_{\text{baseline}} \cdot (1 - p_{\text{baseline}})] . $$

Given this, a sample-size formula for a group of households to whom the Bolivia scorecard is applied twice (once after the end of field work for the 2007 Household Survey and then again later) is:

$$ n = 2 \cdot \left(\frac{\alpha \cdot z}{c} \right)^2 \cdot \{-0.02 + 0.016 \cdot y + 0.47 \cdot [p_{\text{baseline}} \cdot (1 - p_{\text{baseline}})]\} . $$

In Peru (the only other country for which there is a data-based estimate, Schreiner 2009a), the average α across years and poverty lines is about 1.3.

To illustrate the use of this formula, suppose the desired confidence level is 90

percent ($z = 1.64$), the desired confidence interval is 2.0 percentage points ($c = 0.02$),

the poverty line is the national line, and the sample will be scored first in 2009 and then

again in 2012 ($y = 3$). The before-baseline poverty rate is 53.9 percent ($p_{2007} = 0.539$,

Figure 2), and suppose $\alpha = 1.3$. Then the baseline sample size is

$$n = 2 \cdot \left(\frac{1.3 \cdot 1.64}{0.02}\right)^2 \cdot \{-0.02 + 0.016 \cdot 3 + 0.47 \cdot [0.539 \cdot (1 - 0.539)]\} = 3{,}291. \text{ The same}$$

group of 3,291 households is scored at follow-up as well.

8. Targeting

When a program uses the scorecard for targeting, households with scores at or below a cut-off are labeled *targeted* and treated—for program purposes—as if they are below a given poverty line. Households with scores above a cut-off are labeled *non-targeted* and treated—for program purposes—as if they are above a given poverty line.

There is a distinction between *targeting status* (scoring at or below a targeting cut-off) and *poverty status* (having income below a poverty line). Poverty status is a fact that depends on whether income is below a poverty line as directly measured by a survey. In contrast, targeting status is a program's policy choice that depends on a cut-off and on an indirect estimate from a scorecard.

Targeting is successful when households truly below a poverty line are targeted (*inclusion*) and when households truly above a poverty line are not targeted (*exclusion*). Of course, no scorecard is perfect, and targeting is unsuccessful when households truly below a poverty line are not targeted (*undercoverage*) or when households truly above a poverty line are targeted (*leakage*).

Figure 13 depicts these four possible targeting outcomes. Targeting accuracy varies by cut-off; a higher cut-off has better inclusion (but greater leakage), while a lower cut-off has better exclusion (but higher undercoverage).

A program should weigh these trade-offs when setting a cut-off. A formal way to do this is to assign net benefits—based on a program's values and mission—to each of

the four possible targeting outcomes and then to choose the cut-off that maximizes total

net benefits (Adams and Hand, 2000; Hoadley and Oliver, 1998).

Figure 14 shows the distribution of households by targeting outcome. For an

example cut-off of 49 or less and the 2007 scorecard applied to the 2007 validation

sample, outcomes for the national line are:

- Inclusion: 45.2 percent are below the line and correctly targeted
- Undercoverage: 9.3 percent are below the line and mistakenly not targeted
- Leakage: 14.5 percent are above the line and mistakenly targeted
- Exclusion: 31.0 percent are above the line and correctly not targeted

Increasing the cut-off to 54 or less improves inclusion and undercoverage but

worsens leakage and exclusion:

- Inclusion: 49.0 percent are below the line and correctly targeted
- Undercoverage: 5.5 percent are below the line and mistakenly not targeted
- Leakage: 21.0 percent are above the line and mistakenly targeted
- Exclusion: 24.5 percent are above the line and correctly not targeted

Which cut-off is preferred depends on total net benefit. If each targeting outcome

has a per-household benefit or cost, then total net benefit for a given cut-off is:

Benefit per household correctly included   x   Households correctly included   –
Cost per household mistakenly not covered   x   Households mistakenly not covered   –
Cost per household mistakenly leaked   x   Households mistakenly leaked   +
Benefit per household correctly excluded   x   Households correctly excluded.

To set an optimal cut-off, a program would:

- Assign benefits and costs to possible outcomes, based on its values and mission
- Tally total net benefits for each cut-off using Figure 14 for a given poverty line
- Select the cut-off with the highest total net benefit

The most difficult step is assigning benefits and costs to targeting outcomes. Any

program that uses targeting—with or without scoring—should thoughtfully consider

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how it values successful inclusion or exclusion versus errors of undercoverage and

leakage. It is healthy to go through a process of thinking explicitly and intentionally

about how possible targeting outcomes are valued.

A common choice of benefits and costs is "Total Accuracy" (IRIS Center, 2005;

Grootaert and Braithwaite, 1998). With "Total Accuracy", total net benefit is the

number of households correctly included or correctly excluded:

Total Accuracy = 1 x Households correctly included –
                  0 x Households mistakenly undercovered –
                  0 x Households mistakenly leaked +
                  1 x Households correctly excluded.

Figure 14 shows "Total Accuracy" for all cut-offs for Bolivia's scorecard. For the

national line in the 2007 validation sample, total net benefit is greatest (73.4) for a cut-

off of 49 or less, with about three in four Bolivian households correctly classified.

"Total Accuracy" weighs successful inclusion of households below the line the

same as successful exclusion of households above the line. If a program valued inclusion

more (say, twice as much) than exclusion, it could reflect this by setting the benefit for

inclusion to 2 and the benefit for exclusion to 1. Then the chosen cut-off would

maximize (2 x Households correctly included) + (1 x Households correctly excluded).[18]

As an alternative to assigning benefits and costs to targeting outcomes and then

choosing a cut-off to maximize total net benefit, a program could set a cut-off to

achieve a desired poverty rate among targeted households. The third column of Figure

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[18] Figure 14 also reports "BPAC", discussed in Section 9 below.

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15 ("% targeted who are poor") shows the expected poverty rate among Bolivian households who score at or below a given cut-off. For the example of the national line and the 2007 validation sample, targeting households who score 49 or less would target 59.6 percent of all households (second column) and produce a poverty rate among those targeted of 75.7 percent (third column).

Figure 15 also reports two other measures of targeting accuracy. The first is a version of inclusion ("% of poor who are targeted"). For the example of the national line and the 2007 validation sample with a cut-off of 49 or less, 82.9 percent of all poor households are covered.

The final targeting measure in Figure 15 is the number of successfully targeted poor households for each non-poor household mistakenly targeted (right-most column). For the national line, the 2007 validation sample, and a cut-off of 49 or less, covering 3.1 poor households means leaking to 1 non-poor household.

9. The context of poverty-assessment tools for Bolivia

This section discusses two existing Bolivia poverty-assessment tools in terms of their goals, methods, poverty lines, indicators, accuracy, and precision. The relative strengths of the new scorecard here are its use of the latest nationally representative data, its testing of accuracy and precision out-of-sample, and its reporting of formulas for standard errors.

9.1   Jiménez, Lizárraga, and Canavire

Jiménez, Lazárraga, and Canavire ("JLC", 2003) use poverty-assessment tools to construct a "poverty map" (Elbers, Lanjouw, and Lanjouw, 2003) to estimate poverty status for Bolivia's municipalities. According to Arias and Robles (2007, p. 68), "The purpose is to generate local indicators of monetary poverty and consumption inequality for the measurement of municipal disparities and provide an additional tool for planning and targeting within Bolivia's poverty reduction strategy and the on-going process of decentralization and local participation".

JLC build 16 tools (urban and rural for eight departments) using stepwise ordinary least squares on the logarithm of per-capita expenditure for a pooled sample of the 13,328 households in the 1999, 2000, and 2001 Household Surveys, using only indicators found also in the 2001 National Population and Housing Census.

They apply the tools to households in the 2001 census to estimate poverty rates by municipality, using an "extreme" line equal to the cost of the minimal food basket, a

"low" line corresponding to the food line here, and a "high" line corresponding to the national line here. At the municipal level, the poverty-mapping estimates are more precise than direct estimates based on the Household Surveys. Finally, JLC make "poverty maps" that quickly show—in a way that is clear for non-specialists—how poverty rates vary across municipalities.

Poverty mapping in JLC and the scorecard in this paper are similar in that they both:

- Build tools with nationally representative survey data and then apply them to other data on sub-groups that may not be nationally representative
- Use simple, verifiable indicators that are quick and inexpensive to collect
- Provide unbiased estimates when their assumptions hold
- Are used to estimate poverty rates for groups
- Seek to be useful in practice and so aim to be understood by non-specialists

Strengths of poverty mapping include that it:

- Has formally established theoretical properties
- Can be applied straightforwardly to measures of well-being beyond poverty rates
- Requires less data for scorecard construction and calibration
- Includes community-level indicators
- Uses only indicators that appear in a census

Strengths of the scorecard include that it:

- Is simpler in terms of both construction and application
- Tests accuracy empirically
- Associates poverty likelihoods with scores non-parametrically
- Uses judgment and theory in scorecard construction to reduce overfitting
- Estimates poverty likelihoods for individual households
- Reports straightforward formulas for standard errors

The basic difference between the two approaches is that poverty mapping seeks to help governments design and target pro-poor policies, while the scorecard seeks to

help small, local pro-poor organizations to manage their outreach when implementing

policies.[19]

JLC use the following indicators in their tools for Bolivia:

- Characteristics of the household head:
  — Age
  — Education
  — Mother tongue
  — Whether holds a professional occupation
  — Place of birth
  — Sex
- Demographics of the household:
  — Number of members (and its square)
  — Number of children ages six or younger
  — Type of family structure
- Characteristics of the residence:
  — Number of rooms
  — Type of walls
  — Type of floors
  — Type of roof
  — Type of toilet arrangement
  — Type of fuel used for cooking
  — Source of water
  — Presence of electrical connection
  — Presence of piped-in gas

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[19] Another apparent difference is that the developers of the poverty-mapping approach (Elbers, Lanjouw, and Lanjouw, 2003; Demombynes *et al.*, 2002) say that it is too inaccurate to be used for targeting individual households, while Schreiner (2008c) supports such targeting as a legitimate, potentially useful application of the scorecard. Recently, the developers of poverty mapping seem to have taken a small step away from their original position (Elbers *et al.*, 2007).

- Ownership of durable assets:
  — Radio or stereo
  — Television
  — Refrigerator
  — Land-line or cellular telephone
  — Bicycle
  — Motorcycle
  — Motor vehicle
- Characteristics of the municipality (average):
  — Type of floors
  — Type of walls
  — Type of roof
  — Housing material and area
  — Educational attainment
  — Type of fuel used for cooking
  — Type of toilet arrangement
  — Source of water
  — Presence of an electrical connection
  — Proximity to health services

The average tool uses 17 of these 36 indicators and is based on 833 households.

All 16 tools are built with stepwise regression, so some may be overfit. For example,

"type of cooking fuel" is an indicator only for urban Cochabamba, rural La Paz, and

rural Oruro; it seems more logical that this be an indicator everywhere, or nowhere, and

the fact that it shows up in three of 16 tools suggests overfitting.

Because the 2001 Census does not measure of income, JLC cannot test accuracy

out-of-sample, that is, using data that is not also used to construct the tool. JLC report

standard errors, but not sample sizes, so the precision of their estimates cannot be

compared with those in this paper.

Arias and Robles conclude that JLC's poverty maps "have had a modest impact

on policy-making in Bolivia" (p. 80). Despite the maps' simplicity, Arias and Robles

suggest that greater impact would require more simplification, updates (presumably

after the next census), and active promotion among potential users, training for mid-

level technicians, and simple tools to overlay poverty maps on other maps.

9.2   IRIS Center

USAID commissioned IRIS Center ("IRIS", 2009) to build a poverty-assessment

tool for use by its Bolivian microenterprise partners for reporting on their participants'

poverty rates. Given this mandate, IRIS considers only the USAID "extreme" poverty

line, using the 2005 Household Survey to estimate income via quantile regression

(Koenker and Hallock, 2001).[20] IRIS' 15 indicators are:[21]

- Household demographics:
    — Household size
    — Age of the household head
- Characteristics of the residence:
    — Tenancy status
    — Type of wall
    — Type of floor

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[20] Except for the content of the questionnaire, all information about the IRIS tool here is based on personal communication with Anthony Leegwater.
[21] IRIS does not report the actual tool, so this list is based on its questionnaire.

- Asset ownership:
  — Radio
  — Refrigerator or freezer
  — Television
  — VCR, VHS, DVD, etc.
  — Fan
  — Car
  — Cots or beds
  — Stoves
  — Computers
  — Sheep

All of these indicators are simple to collect and verify.

IRIS does not report its tool's points; the index can be computed only with free

IRIS-provided software which reports not indexes for individual households but rather

only an estimate of a group's poverty rate. This set-up precludes use for targeting.

IRIS' preferred measure of accuracy is the "Balanced Poverty Accuracy

Criterion", and USAID uses BPAC as its criterion for certifying poverty-assessment

tools (IRIS Center, 2005). BPAC depends on inclusion and on the difference between

the estimated poverty rate and its true value (equivalent to the difference between

undercoverage and leakage). The BPAC formula is:

(Inclusion – |Undercoverage – Leakage|) x [100 ÷ (Inclusion + Undercoverage)].

A higher BPAC is preferred. For the USAID "extreme" line, the IRIS tool has an

mean out-of-sample bootstrapped BPAC of 49.3,[22] while a cut-off of 29 or less for the

new scorecard here gives a BPAC of 43.2 (Figure 14 for the USAID "extreme" line, 2007

scorecard applied to the 2005 Household Survey).

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[22] The 95-percent confidence interval is ±11.9.

The main distinction between the new scorecard here and the IRIS tool is transparency and usability: IRIS requires more data, only estimates poverty rates for groups, and does not report points or precision.[23]

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[23] Anthony Leegwater notes that IRIS does not reveal points in order to reduce the opportunity for manipulation. He also notes that the points and measures of precision are available on request.

10. Conclusion

This paper presents the scorecard, a low-cost tool that pro-poor programs in Bolivia can be used to estimate the likelihood that a household has income below a given poverty line, to estimate the poverty rate of a group of households at a point in time, and to estimate changes in the poverty rate of a group of households between two points in time. The scorecard can also be used for targeting.

The scorecard is inexpensive to use and can be understood by non-specialists. It is designed to be practical for local pro-poor organizations who want to improve how they monitor and manage their social performance.

The scorecard is built with a sub-sample of data from the 2007 Household Survey, tested on a different sub-sample from the 2007 Household Survey and on the 2005 Household Survey, and calibrated to eight poverty lines (national, food, 150% of national, 200% of national, USAID "extreme", \$1.25/day 2005 PPP, \$2.50/day 2005 PPP, and \$3.75/day 2005 PPP).

Accuracy is reported for estimates of households' poverty likelihoods, groups' poverty rates at a point in time, and changes in groups' poverty rates over time. Of course, the scorecard's estimates of changes in poverty rates are not the same as estimates of program impact. Targeting accuracy and formula for standard errors are also reported.

When the scorecard is applied to the national line for the 2007 validation sample with $n = 16{,}384$, the difference between the estimate and the true poverty rates at that

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point in time is –1.2 percentage points; the average of the absolute differences across the eight poverty lines is 0.7 percentage points. With 90-percent confidence, the precision of these differences is ±0.6 percentage points or less. In this case, the scorecard is usually more precise than direct measurement.

When used to measure change across independent samples of $n = 16{,}384$ between the 2007 validation sample and the 2005 Household Survey, the average absolute difference between estimates and true changes across poverty lines and years is large (6.1 percentage points) for poverty lines related to Bolivia's official lines but small (0.9 percentage points) for 2005 PPP poverty lines. It appears that the official lines are too high and that—in contrast to the official measurement that poverty slightly increased from 2005 to 2007—poverty actually sharply decreased.

For targeting, programs can use the results reported here to select a cut-off that fits their values and mission.

Although the statistical technique is innovative, and although technical accuracy is important, the design of the scorecard focuses on transparency and ease-of-use. After all, a perfectly accurate scorecard is worthless if programs feel so daunted by its complexity or its cost that they do not even try to use it. For this reason, the scorecard is kept simple, using ten indicators that are inexpensive to collect and that are straightforward to verify. Points are all zeros or positive integers, and scores range from 0 (most likely below a poverty line) to 100 (least likely below a poverty line). Scores are related to poverty likelihoods via simple look-up tables, and targeting cut-offs are

likewise simple to apply. The design attempts to facilitate adoption by helping

managers understand and trust scoring and by allowing non-specialists to generate

scores quickly in the field.

In sum, the scorecard is a practical, objective way for pro-poor programs in

Bolivia to monitor poverty rates, track changes in poverty rates over time, and target

services, provided that it is applied during a period similar to that of late 2007, the

point in time when the data used to construct the scorecard was collected. The same

approach can be applied to any country with similar data from a national income or

expenditure survey.

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Figure 2: Sample sizes and household poverty rates by sub-sample, survey round and poverty line

			% with income below a poverty line							
			National				USAID	International 2005 PPP		
Sub-sample	Round	Households	100%	Food	150%	200%	'Extreme'	$1.25/day	$2.50/day	$3.75/day
All Bolivia	2007	4,156	53.9	33.8	67.8	76.1	26.5	13.7	31.0	43.7
	2005	4,046	53.7	32.5	67.7	76.5	24.3	19.0	34.8	49.7
Construction										
Selecting indicators and points	2007	1,401	53.3	33.9	67.9	75.8	26.1	13.2	30.9	43.5
Calibration										
Associating scores with likelihoods	2007	1,363	53.7	34.1	67.7	76.2	26.4	13.9	30.9	43.3
Validation										
Measuring accuracy	2007	1,392	54.5	33.5	67.8	76.7	26.9	14.0	31.0	44.3
Change in poverty rate (percentage points)										
From 2007 construction/calibration to 2007 validation			–0.9	+0.5	+0.0	–0.7	–0.7	–0.4	–0.1	–0.9
From 2007 validation to 2005 for all Bolivia			+0.8	+0.9	+0.1	+0.2	+2.7	–5.1	–3.8	–5.4

Source: 2005 and 2007 *Encuesta de Hogares*, after removing most heavily weighted cases and breaking up other heavily weighted cases.

Figure 3a: All Bolivia, poverty lines and poverty rates, by round and by urban/rural

Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
		100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
2005	Line	11.05	6.04	16.58	22.11	5.23	3.27	6.54	9.81
	Rate (households)	53.6	32.7	67.5	76.1	25.0	19.4	35.2	49.8
	Rate (people)	59.4	36.5	73.1	81.0	29.1	21.3	39.5	55.4
2007	Line	14.45	7.85	21.68	28.91	7.27	3.83	7.66	11.49
	Rate (households)	53.0	32.9	66.7	75.2	25.1	12.8	29.8	42.5
	Rate (people)	60.1	37.7	74.3	81.7	29.5	14.3	34.3	48.8

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3b: All-urban and all-rural, Bolivia, poverty lines and poverty rates, by round

Region	Round	Line/rate	National				USAID	International 2005 PPP		
			100%	Food	150%	200%	'extreme'	$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.06	6.47	18.09	24.11	7.02	3.57	7.13	10.70
		Rate (households)	41.4	17.0	58.2	68.8	19.4	5.0	20.4	36.7
		Rate (people)	47.9	20.4	64.5	74.2	23.4	5.7	24.5	42.8
	2007	Line	15.85	8.44	23.78	31.70	9.04	4.20	8.40	12.60
		Rate (households)	44.0	19.7	61.8	71.4	20.8	3.4	19.1	33.2
		Rate (people)	50.9	23.7	69.8	78.2	25.3	4.1	23.2	39.2
Rural	2005	Line	9.26	5.28	13.88	18.51	2.03	2.74	5.48	8.21
		Rate (households)	75.8	61.3	84.3	89.3	35.3	45.6	62.0	73.7
		Rate (people)	80.0	65.6	88.6	93.3	39.5	49.3	66.5	78.0
	2007	Line	11.84	6.75	17.76	23.67	3.95	3.14	6.27	9.41
		Rate (households)	69.8	57.4	75.8	82.1	33.1	30.3	49.6	59.8
		Rate (people)	77.3	63.9	82.7	88.3	37.5	33.4	55.2	66.7

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3c: Chuquisaca, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.08	6.38	18.11	24.15	6.23	3.57	7.14	10.72
		Rate (households)	51.9	27.9	65.1	74.8	26.9	8.3	35.4	44.9
		Rate (people)	58.6	30.0	70.4	79.5	29.2	8.4	41.3	52.0
	2007	Line	16.23	8.58	24.35	32.47	8.50	4.30	8.60	12.91
		Rate (households)	48.6	23.5	64.5	73.8	21.8	3.7	23.5	37.5
		Rate (people)	57.5	31.4	73.1	79.6	28.6	5.2	31.4	47.1
Rural	2005	Line	9.26	5.28	13.88	18.51	1.39	2.74	5.48	8.21
		Rate (households)	86.7	71.9	89.0	92.8	36.4	55.8	72.5	84.8
		Rate (people)	93.0	80.9	94.3	97.3	45.3	66.1	81.3	91.9
	2007	Line	11.84	6.75	17.76	23.67	3.16	3.14	6.27	9.41
		Rate (households)	76.7	68.6	83.5	86.3	32.6	32.6	58.1	70.4
		Rate (people)	85.5	77.9	90.7	93.0	41.5	41.5	66.1	80.5

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3d: La Paz, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National 100%	Food	National 150%	National 200%	USAID 'extreme'	International 2005 PPP $1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.12	6.74	18.19	24.25	7.23	3.59	7.17	10.76
		Rate (households)	41.3	18.1	55.8	63.6	19.1	4.7	19.1	37.9
		Rate (people)	46.1	21.8	61.4	68.7	23.0	5.6	23.0	42.2
	2007	Line	14.16	7.87	21.24	28.33	8.11	3.75	7.51	11.26
		Rate (households)	37.6	16.5	56.6	63.8	17.1	1.9	15.6	28.7
		Rate (people)	43.4	21.0	64.7	71.0	21.6	2.7	20.1	33.8
Rural	2005	Line	9.26	5.28	13.88	18.51	1.65	2.74	5.48	8.21
		Rate (households)	78.6	67.4	85.8	89.2	37.6	51.8	68.2	77.3
		Rate (people)	80.1	70.4	88.6	92.6	39.8	53.3	71.3	78.3
	2007	Line	11.84	6.75	17.76	23.67	3.81	3.14	6.27	9.41
		Rate (households)	71.4	59.5	79.6	84.2	37.3	35.6	49.8	62.0
		Rate (people)	74.9	63.5	81.3	86.0	37.4	35.0	51.0	65.4

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3e: El Alto, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	9.85	5.98	14.77	19.70	5.69	2.91	5.83	8.74
		Rate (households)	47.8	22.7	69.2	78.4	19.2	2.3	22.7	42.3
		Rate (people)	52.6	26.9	74.2	82.0	23.4	2.9	26.9	47.7
	2007	Line	12.20	7.40	18.30	24.39	6.55	3.23	6.46	9.70
		Rate (households)	53.2	30.9	70.1	81.2	24.7	2.0	24.2	44.3
		Rate (people)	59.2	35.9	75.2	84.9	29.4	2.7	28.6	50.1
Rural	2005	Line	12.64	6.38	18.96	25.28	7.18	3.74	7.48	11.22
		Rate (households)	38.4	16.1	59.8	71.3	19.0	7.5	19.7	34.0
		Rate (people)	43.2	17.7	64.7	74.8	21.4	8.2	22.1	39.0
	2007	Line	17.09	8.58	25.64	34.19	7.95	4.53	9.06	13.59
		Rate (households)	41.5	21.4	58.0	68.7	19.8	4.5	22.4	33.6
		Rate (people)	46.3	24.5	65.9	75.1	23.1	5.2	25.5	38.6

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3f: Cochabamba, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National 100%	Food	150%	200%	USAID 'extreme'	International 2005 PPP $1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.64	6.38	18.96	25.28	7.18	3.74	7.48	11.22
		Rate (households)	38.4	16.1	59.8	71.3	19.0	7.5	19.7	34.0
		Rate (people)	43.2	17.7	64.7	74.8	21.4	8.2	22.1	39.0
	2007	Line	17.09	8.58	25.64	34.19	7.95	4.53	9.06	13.59
		Rate (households)	41.5	21.4	58.0	68.7	19.8	4.5	22.4	33.6
		Rate (people)	46.3	24.5	65.9	75.1	23.1	5.2	25.5	38.6
Rural	2005	Line	9.26	5.28	13.88	18.51	1.23	2.74	5.48	8.21
		Rate (households)	79.8	63.8	89.3	93.7	38.0	52.2	64.3	77.1
		Rate (people)	83.3	67.7	91.3	95.4	41.4	55.9	68.4	80.9
	2007	Line	11.84	6.75	17.76	23.67	4.13	3.14	6.27	9.41
		Rate (households)	55.2	45.0	59.3	72.6	27.0	16.3	39.7	46.9
		Rate (people)	64.7	52.8	70.5	82.8	32.2	17.2	47.0	55.8

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3g: Oruro, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National 100%	Food	National 150%	National 200%	USAID 'extreme'	International 2005 PPP $1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	11.02	6.74	16.54	22.05	7.41	3.26	6.52	9.78
		Rate (households)	40.0	18.0	55.8	70.4	19.6	7.7	16.5	35.4
		Rate (people)	45.6	19.8	62.3	78.3	21.5	8.1	18.7	42.0
	2007	Line	12.88	7.87	19.32	25.76	8.93	3.41	6.83	10.24
		Rate (households)	35.8	13.9	54.9	66.6	17.1	0.9	11.4	24.8
		Rate (people)	40.4	15.5	60.9	72.8	20.1	0.7	12.8	27.0
Rural	2005	Line	9.26	5.28	13.88	18.51	2.72	2.74	5.48	8.21
		Rate (households)	71.3	56.1	84.7	88.4	31.7	32.3	58.1	69.7
		Rate (people)	77.7	63.9	90.0	92.5	37.9	38.9	66.0	75.8
	2007	Line	11.84	6.75	17.76	23.67	3.29	3.14	6.27	9.41
		Rate (households)	70.1	60.4	78.8	80.8	30.2	30.2	54.0	61.6
		Rate (people)	78.6	72.8	86.1	87.7	37.6	37.6	68.1	73.2

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3h: Potosí, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	10.14	6.74	15.21	20.28	5.55	3.00	6.00	9.00
		Rate (households)	47.1	30.5	64.8	78.2	24.4	8.3	25.8	41.0
		Rate (people)	55.6	34.4	72.7	85.1	27.5	8.8	29.4	48.0
	2007	Line	11.85	7.87	17.77	23.69	6.49	3.14	6.28	9.42
		Rate (households)	42.2	27.5	59.6	70.2	19.9	4.1	19.7	32.0
		Rate (people)	50.1	33.2	67.8	78.2	24.6	4.8	24.5	39.2
Rural	2005	Line	9.26	5.28	13.88	18.51	1.58	2.74	5.48	8.21
		Rate (households)	82.3	72.2	85.6	89.6	38.0	52.1	72.2	81.1
		Rate (people)	89.1	77.9	92.4	94.3	43.6	58.5	77.9	88.5
	2007	Line	11.84	6.75	17.76	23.67	1.52	3.14	6.27	9.41
		Rate (households)	79.7	72.9	83.3	86.7	39.4	55.4	69.6	75.5
		Rate (people)	87.1	78.8	90.3	92.4	43.3	63.6	74.6	82.6

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3j: Santa Cruz, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National				USAID	International 2005 PPP		
			100%	Food	150%	200%	'extreme'	$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.78	6.49	19.18	25.57	7.57	3.78	7.56	11.34
		Rate (households)	37.0	10.7	51.2	63.0	17.4	2.9	17.4	31.9
		Rate (people)	45.0	14.2	58.3	69.0	22.3	3.5	22.3	38.8
	2007	Line	17.86	9.07	26.79	35.72	11.13	4.73	9.47	14.20
		Rate (households)	46.6	16.5	65.1	74.0	22.7	4.4	18.3	32.7
		Rate (people)	55.0	20.0	73.7	81.1	27.4	4.9	22.2	39.0
Rural	2005	Line	9.26	5.28	13.88	18.51	3.89	2.74	5.48	8.21
		Rate (households)	55.4	31.0	69.9	80.9	26.1	20.8	31.8	51.0
		Rate (people)	62.0	36.3	77.7	87.9	30.7	24.0	37.8	58.0
	2007	Line	11.84	6.75	17.76	23.67	5.96	3.14	6.27	9.41
		Rate (households)	74.2	51.9	77.9	85.7	32.4	18.5	41.9	56.8
		Rate (people)	81.8	59.3	85.3	91.3	39.1	24.2	49.5	64.0

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3i: Tarija, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National 100%	Food	150%	200%	USAID 'extreme'	International 2005 PPP $1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.64	6.38	18.96	25.28	6.55	3.74	7.48	11.22
		Rate (households)	45.6	18.3	61.6	70.2	20.1	7.5	23.4	43.7
		Rate (people)	54.7	24.3	69.5	77.9	27.1	9.2	30.2	53.1
	2007	Line	16.99	8.58	25.49	33.99	10.73	4.50	9.01	13.51
		Rate (households)	39.4	15.0	56.9	70.9	20.1	2.6	15.7	28.7
		Rate (people)	44.5	15.7	62.6	75.9	21.5	1.8	16.1	32.0
Rural	2005	Line	9.26	5.28	13.88	18.51	2.56	2.74	5.48	8.21
		Rate (households)	73.2	59.6	85.8	91.9	35.7	38.3	61.4	69.9
		Rate (people)	77.7	64.5	90.6	95.6	38.7	41.2	67.8	75.2
	2007	Line	11.84	6.75	17.76	23.67	4.47	3.14	6.27	9.41
		Rate (households)	80.6	64.8	82.7	87.5	35.0	25.7	56.7	65.8
		Rate (people)	89.2	70.9	90.2	94.9	43.4	34.8	66.6	72.6

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3k: Beni, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National 100%	Food	National 150%	200%	USAID 'extreme'	International 2005 PPP $1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.78	6.49	19.18	25.57	7.69	3.78	7.56	11.34
		Rate (households)	49.1	18.7	68.9	78.3	23.9	6.9	23.9	43.7
		Rate (people)	57.9	23.1	76.3	85.0	28.5	8.6	28.5	50.5
	2007	Line	17.86	9.07	26.79	35.72	9.99	4.73	9.47	14.20
		Rate (households)	50.6	19.6	69.2	76.9	24.0	5.6	21.0	36.9
		Rate (people)	60.7	25.6	80.5	88.0	30.2	7.2	27.2	47.8
Rural	2005	Line	9.26	5.28	13.88	18.51	2.19	2.74	5.48	8.21
		Rate (households)	75.1	59.5	88.7	92.9	30.9	37.5	61.7	74.3
		Rate (people)	82.8	68.6	91.8	95.7	39.8	47.2	70.2	82.3
	2007	Line	11.84	6.75	17.76	23.67	6.35	3.14	6.27	9.41
		Rate (households)	51.1	23.2	65.2	72.3	16.4	7.3	16.0	23.6
		Rate (people)	67.3	35.3	80.4	85.6	22.5	7.2	22.4	35.5

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 3l: Pando, poverty lines and poverty rates, by round and by urban/rural

Region	Round	Line/rate	National				USAID 'extreme'	International 2005 PPP		
			100%	Food	150%	200%		$1.25/day	$2.50/day	$3.75/day
Urban	2005	Line	12.78	6.49	19.18	25.57	8.76	3.78	7.56	11.34
		Rate (households)	15.6	2.4	28.1	35.4	7.3	2.4	2.4	15.6
		Rate (people)	22.2	3.2	36.4	44.1	11.1	3.2	3.2	22.2
	2007	Line	17.86	9.07	26.79	35.72	9.13	4.73	9.47	14.20
		Rate (households)	19.4	7.2	37.2	51.7	7.2	0.0	8.6	16.1
		Rate (people)	20.4	7.8	43.1	59.1	7.8	0.0	10.5	17.5
Rural	2005	Line	9.26	5.28	13.88	18.51	3.29	2.74	5.48	8.21
		Rate (households)	48.4	35.5	63.6	83.5	20.8	18.5	35.5	44.3
		Rate (people)	57.7	43.0	73.6	90.0	25.9	22.6	43.0	53.3
	2007	Line	11.84	6.75	17.76	23.67	5.71	3.14	6.27	9.41
		Rate (households)	51.3	42.3	68.4	68.5	16.7	4.7	25.1	42.3
		Rate (people)	58.5	49.6	79.4	79.4	24.7	4.9	33.1	49.6

Poverty lines are in units of BOB per person per day. Poverty rates are percentages.

Figure 4: Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly indicative of poverty)
1,455	What is the highest educational level that a household member has completed? (None, literacy course, pre-school, primary (1 to 5 years) in the previous system, or middle school (1 to 3 years) in the previous system; Primary (1 to 8 years) in the current system, basic adult education in the previous system, or advanced adult education in the previous system; High school (1 to 4 years) in the current system; Teacher's college, public university (degree), private university (degree), graduate, masters, or doctorate, post-secondary technical university, post-secondary technical institute, military and police school, other courses of less than a year, alternative education for youth, primary or secondary adult education)
1,347	What is the highest educational level that the female head/spouse passed? (None, literacy course, pre-school, or primary (1 to 5 years) in the previous system; Basic adult education in the previous system, or advanced adult education in the previous system; Primary (1 to 8 years) in the current system; High school (1 to 4 years) in the current system; Middle school (1 to 3 years) in the previous system; High school (1 to 4 years) in the previous system; There is no female head/spouse; Teacher's college, public university (degree), private university (degree), graduate, masters, or doctorate, post-secondary technical university, post-secondary technical institute, military and police school, other courses of less than a year, alternative education for youth, primary or secondary adult education)
1,321	Does the household have a land-line telephone, and how many cellular telephones does it have? (Does not have a land-line telephone nor cellular; Does not have a land-line telephone but does have one or two cellulars; Does not have a land-line telephone but does have three or more cellulars; Has a land-line telephone but no cellular; Has a land-line telephone and one cellular; Has a land-line telephone and two cellulars; Has a land-line telephone and three or more cellulars)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly associated with poverty)
1,157	What is the highest educational level that the male head/spouse passed? (None, literacy course, pre-school, or primary (1 to 5 years) in the previous system; Middle school (1 to 3 years) in the previous system; Primary (1 to 8 years) in the current system; High school (1 to 4 years) in the previous system; There is no male head/spouse; High school (1 to 4 years) in the current system; Basic adult education in the previous system, advanced adult education in the previous system, teacher's college, public university (degree), private university (degree), graduate, masters, or doctorate, post-secondary technical university, post-secondary technical institute, military and police school, other courses of less than a year, alternative education for youth, primary or secondary adult education)
994	What is the main construction material of the floors of the residence? (Earth, bricks, or other; Wooden planks, cement, hardwood floors, parquet, rugs or carpets; Tile (mosaic, stone, or ceramic))
895	To where does the waste from the bathroom, toilet, or latrine drain? (There is no bathroom, toilet, or latrine; Closed pit, or onto the ground (street/stream/river); Septic tank; Sewer system)
865	How is water for drinking and cooking delivered? (Not piped, or by pipes outside the house and outside the yard or compound; By pipes outside the house, but inside the yard or compound; By pipes inside the residence)
840	Does the household have land-line telephone service? (No; Yes)
815	Does the household own, have, or use a television? (No; Yes)
758	In his main occupation, what does the male head/spouse work as? (Self-employed with no employees, member of a cooperative, or family worker or non-remunerated apprentice; Blue-collar employee; There is no male head/spouse; Self-employed with employees; White-collar employee; Does not work)
754	How many household members are 0 to 17 years old? (Four or more; Three; Two; One; None)
746	How many household members are 0 to 16 years old? (Four or more; Three; Two; One; None)
740	How many household members are 0 to 15 years old? (Four or more; Three; Two; One; None)
736	Does the household own, have, or use a computer? (No; Yes)
729	How many household members are 0 to 18 years old? (Four or more; Three; Two; One; None)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly associated with poverty)
721	How many cellular telephones do members of the household have? (None; One; Two or more)
708	Do any household members have white-collar jobs? (No; Yes)
708	Does the household own, have, or use a living-room set? (No; Yes)
703	How many household members are 0 to 12 years old? (Three or more; Two; One; None)
673	Does the household own, have, or use a VCR or DVD player? (No; Yes)
673	How many household members are 0 to 13 years old? (Three or more; Two; One; None)
672	How many household members are 0 to 14 years old? (Three or more; Two; One; None)
661	Does the household own, have, or use a refrigerator or freezer? (No; Yes)
660	How many household members are 0 to 11 years old? (Three or more; Two; One; None)
631	In her main occupation, what does the female head/spouse work as? (Family worker or non-remunerated apprentice; Blue-collar employee; Does not work; Self-employed with or without employees, or member of a cooperative; There is no female head/spouse; White-collar employee)
597	Does the household own, have, or use a stereo or hi-fi system? (No; Yes)
585	Does the residence use electricity for lighting? (No; Yes)
577	Do any household members have blue-collar or white-collar jobs? (No; Yes)
571	How many wardrobes does the household own, have, or use? (None; One; Two; Three or more)
568	Does the household own, have, or use a dining-room set (table and chairs)? (No; Yes)
544	What is the main construction material of the walls of the residence? (Other; Bricks, cinder blocks, or reinforced concrete)
470	Are any household members self-employed or business owners? (Yes; No)
457	Do any household members work for a public/government entity? (No; Yes)
441	Does the household own, have, or use a clothes washer and/or dryer? (No; Yes)
426	What is the main source of water for drinking and cooking? (Other; Public network)
423	How many household members are there? (Seven or more; Six; Five; Four; Three; Two; One)
422	Does the female head/spouse know how to read and write? (No; Yes; There is no female head/spouse)
421	Is the bathroom, toilet, or latrine used only by the household? (There is no bathroom, toilet, or latrine; Yes; No)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly associated with poverty)
421	Does the residence have a bathroom, a toilet, or a latrine? (No; Yes)
412	How many household members ages 6 to 11 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 11)
407	How many household members ages 6 to 12 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 12)
399	How many household members ages 6 to 13currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 13)
392	How many motorcycles or automobiles does the household own, have, or use? (None; One; Two or more)
385	How many household members ages 6 to 14 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 14)
366	Does the household own, have, or use a microwave? (No; Yes)
364	Does the household own, have, or use an automobile (for household use)? (No; Yes)
348	Does the household own, have, or use a stove (gas, electric, etc.)? (No; Yes)
347	How many household members ages 6 to 15 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 15)
340	How many household members are 0 to 14 years old? (Two or more; One; None)
318	How many household members ages 6 to 16 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 16)
311	What is the main construction material of the roof of the residence? (Straw, cane, palm leaves, or mud; Corrugated tin sheets; /Shingles (cement/clay/fiberglass), or other; Reinforced concrete tiles)
309	How many rooms does the household occupy, not counting bathrooms, kitchen, washrooms, garages, or storage rooms? (One; Two; Three; Four; Five or more)
304	How many household members ages 6 to 18 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 18)
299	How many household members ages 6 to 17 currently attend school at the level and grade that they enrolled in for this calendar year? (Not all; All; No children ages 6 to 17)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly associated with poverty)
278	What is the current marital status of the female head/spouse? (Cohabiting; Married; Separated; Single/never-married; Widowed; Divorced; There is no female head/spouse)
248	Are the interior walls of the residence plastered? (No; Yes)
214	How many household members know how to read and write? (None; Five, six, or seven; Two, three, or four; One; Eight or more)
200	Does the household own, have, or use a fan? (No; Yes)
196	What is the main fuel used for cooking? (Firewood, dung/manure, kerosene, LPG in a cylinder, or other; Piped-in natural gas, electricity, or does not cook)
158	How many cots or beds does the household own, have, or use? (None; Two; Three; Four; Five or more; One)
143	Does the male head/spouse know how to read and write? (No; Yes; There is no male head/spouse)
140	What is the current marital status of the male head/spouse? (Cohabiting; Married; Widowed; There is no male head/spouse; Separated, single/never-married, divorced)
134	Does the household own, have, or use a video game machine (Nintendo, Playstation, etc.)? (No; Yes)
132	How many bicycles, motorcycles, or automobiles does the household own, have, or use? (None; One; Two or more)
125	In the past week, did the female head/spouse work for at least one hour? (No; Yes; There is no female head/spouse)
100	Does the household own, have, or use a gas stove or heater? (No; Yes)
96	Does the household own, have, or use a air conditioner? (No; Yes)
90	Of the rooms occupied by the household, how many are used only for sleeping? (None, one, or two; Three or more)
84	What is the tenancy status of the household in its residence? (Owned free and clear; Provided free in exchange for service; Owned with an outstanding mortgage; Rented; Provided free by friends or relatives, or other)

Figure 4 (cont.): Poverty indicators by uncertainty coefficient

Uncertainty coefficient	Indicator (Answers ordered starting with those most strongly associated with poverty)
75	Does the household own, have, or use a motorcycle (for household use)? (No; Yes)
57	Does the household own, have, or use a oven (gas, electric, etc.)? (No; Yes)
45	In the past week, how many household members worked at least one hour? (Four or more; None, one, or two; Three)
21	How many bicycles or motorcycles does the household own, have, or use? (None; One; Two or more)
18	In the past week, did the male head/spouse work for at least one hour? (Yes; There is no male head/spouse; No)
12	Does the household own, have, or use a sewing machine? (No; Yes)
8	How many bicycles does the household own, have, or use? (None; One; Two or more)
5	Do any household members have blue-collar jobs? (Yes; No)
5	What kind of residence does the household have? (Other; Apartment)
1	Does the household own, have, or use a radio-cassette player? (No; Yes)
0	Is there a room dedicated to cooking? (No; Yes)

Source: 2007 *Encuesta de Hogares* and the national poverty line.

National Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

(and tables pertaining to all poverty lines)

Figure 5 (National line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	99.9
10–14	92.8
15–19	94.7
20–24	84.8
25–29	71.5
30–34	82.3
35–39	74.1
40–44	65.8
45–49	52.5
50–54	39.3
55–59	28.9
60–64	14.8
65–69	10.9
70–74	9.5
75–79	5.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 6 (National line): Derivation of estimated poverty likelihoods associated with scores

Score	Households below poverty line		All households at score		Poverty likelihood (estimated, %)
0–4	2,036	÷	2,036	=	100.0
5–9	1,669	÷	1,671	=	99.9
10–14	2,824	÷	3,043	=	92.8
15–19	3,860	÷	4,077	=	94.7
20–24	4,347	÷	5,125	=	84.8
25–29	3,499	÷	4,893	=	71.5
30–34	7,932	÷	9,641	=	82.3
35–39	8,036	÷	10,849	=	74.1
40–44	6,010	÷	9,130	=	65.8
45–49	4,813	÷	9,171	=	52.5
50–54	4,064	÷	10,349	=	39.3
55–59	2,724	÷	9,443	=	28.9
60–64	973	÷	6,561	=	14.8
65–69	768	÷	7,075	=	10.9
70–74	328	÷	3,449	=	9.5
75–79	108	÷	2,163	=	5.0
80–84	0	÷	841	=	0.0
85–89	0	÷	334	=	0.0
90–94	0	÷	148	=	0.0
95–100	0	÷	0	=	0.0

Number of all households normalized to sum to 100,000.

Figure 7 (All poverty lines): Distribution of household poverty likelihoods across ranges demarcated by poverty lines

	Likelihood of having income in range demarcated by poverty lines per day per capita								
	<$1.25/day	=>$1.25/day and <USAID	=>USAID and <$2.50/day	=>$2.50/day and <Food	=>Food and <$3.75/day	=>$3.75/day and <National	=>National and <150% Natl.	=>150% Natl. and <200% Natl.	=>200% Natl.
Score	<BOB3.83	=>BOB3.83 and <BOB7.27	=>BOB7.27 and <BOB7.66	=>BOB7.66 and <BOB7.85	=>BOB7.85 and <BOB11.49	=>BOB11.49 and <BOB14.45	=>BOB14.45 and <BOB21.68	=>BOB21.68 and <BOB28.91	=>BOB28.91
0–4	72.5	3.2	3.2	16.8	0.0	4.4	0.0	0.0	0.0
5–9	73.4	0.0	20.5	0.0	0.0	6.1	0.0	0.0	0.1
10–14	53.4	7.3	9.3	0.1	11.4	11.3	7.2	0.0	0.0
15–19	39.9	9.6	26.9	2.1	9.1	7.1	3.0	2.3	0.0
20–24	29.1	9.9	28.5	5.5	3.5	8.3	8.3	2.0	4.8
25–29	19.7	24.4	8.8	7.7	4.8	6.2	16.2	6.2	6.1
30–34	22.0	20.6	6.3	7.4	18.1	7.9	6.9	7.1	3.7
35–39	22.2	19.3	6.3	3.6	10.1	12.6	7.4	4.1	14.4
40–44	3.7	25.4	0.0	5.1	13.1	18.5	17.1	5.8	11.3
45–49	4.8	16.7	0.0	0.0	13.1	17.9	24.7	5.7	17.1
50–54	1.9	11.1	1.4	1.1	9.9	13.9	19.6	14.7	26.4
55–59	0.0	8.0	0.0	0.6	9.1	11.2	20.8	11.6	38.7
60–64	1.8	1.0	0.0	0.4	6.8	4.8	21.1	19.3	44.9
65–69	0.0	5.0	0.0	0.0	3.1	2.8	16.5	21.5	51.1
70–74	0.0	0.0	0.0	0.0	2.1	7.4	11.1	8.9	70.5
75–79	0.0	5.0	0.0	0.0	0.0	0.0	0.0	5.1	89.9
80–84	0.0	0.0	0.0	0.0	0.0	0.0	2.3	10.8	86.9
85–89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
90–94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
95–100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

Note: All poverty likelihoods in percentage units.

Figure 8 (National line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	−0.1	0.1	0.1	0.1
10–14	−4.4	2.7	2.8	3.0
15–19	+5.5	2.1	2.5	3.4
20–24	−5.9	3.7	3.9	4.2
25–29	−5.8	4.3	4.6	5.0
30–34	+8.4	1.9	2.2	3.0
35–39	−2.9	2.3	2.4	2.8
40–44	−7.5	4.7	4.9	5.2
45–49	−0.1	2.4	2.9	4.1
50–54	+5.0	2.0	2.3	3.0
55–59	−6.4	4.4	4.6	4.9
60–64	+1.5	1.6	2.0	2.6
65–69	−2.5	2.1	2.3	2.7
70–74	+7.1	0.9	1.1	1.3
75–79	+4.6	0.3	0.4	0.5
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 9 (All poverty lines): Differences, precision of differences, and the α factor for bootstrapped estimates of poverty rates for groups of households at a point in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

		Poverty line							
		National				USAID	International 2005 PPP		
		100%	Food	150%	200%	'Extreme'	$1.25/day	$2.50/day	$3.75/day
Estimate minus true value									
2007 scorecard applied to 2007 validation		–0.5	+0.2	+0.8	+0.7	–1.2	–1.0	–0.4	–0.8
2007 scorecard applied to all 2005		+6.0	+7.9	+6.3	+4.9	+5.7	–1.2	+1.8	–0.6
Precision of difference									
2007 scorecard applied to 2007 validation		0.5	0.6	0.5	0.5	0.6	0.5	0.6	0.6
2007 scorecard applied to all 2005		0.6	0.5	0.6	0.6	0.5	0.4	0.5	0.6
α for sample size									
2007 scorecard applied to 2007 validation		0.85	0.94	0.88	0.93	1.04	1.18	0.97	0.91
2007 scorecard applied to all 2005		0.92	0.85	0.98	1.06	0.94	0.93	0.91	0.94
Precision is measured as 90-percent confidence intervals in units of +/– percentage points.									
Differences and precision estimated from 500 bootstraps of size $n = 16,384$.									
α is estimated from 1,000 bootstrap samples of $n = 256, 512, 1,024, 2,048, 4,096, 8,192,$ and $16,384$.									

Figure 10 (National line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+1.3	67.4	76.7	91.4
4	−0.6	35.7	42.3	53.2
8	−1.2	25.1	29.7	39.0
16	−1.0	17.2	20.2	27.7
32	−0.4	12.0	14.4	19.8
64	−0.6	8.3	9.8	12.5
128	−0.5	6.1	7.2	9.6
256	−0.5	4.4	5.3	6.8
512	−0.5	3.1	3.7	4.7
1,024	−0.4	2.2	2.8	3.5
2,048	−0.4	1.5	1.8	2.4
4,096	−0.5	1.1	1.3	1.7
8,192	−0.5	0.8	0.9	1.2
16,384	−0.5	0.5	0.6	0.9

Figure 11 (All poverty lines): Differences, precision of differences, and the α factor for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

		Poverty line							
		National				USAID	International 2005 PPP		
		100%	Food	150%	200%	'Extreme'	$1.25/day	$2.50/day	$3.75/day
Estimated change minus true change									
2007 scorecard applied to 2007 validation and all 2005		+6.4	+7.7	+5.4	+4.2	+6.9	−0.3	+2.2	+0.2
Precision of estimated change minus true change									
2007 scorecard applied to 2007 validation and all 2005		0.8	0.7	0.8	0.8	0.8	0.7	0.8	0.8
α for sample size									
2007 scorecard applied to 2007 validation and all 2005		1.26	1.24	1.33	1.42	1.40	1.49	1.30	1.31
Precision is measured as 90-percent confidence intervals in units of +/− percentage points.									
Differences and precision estimated from 500 bootstraps of size n = 16,384.									
α is estimated from 1,000 bootstrap samples of n = 256, 512, 1,024, 2,048, 4,096, 8,192, and 16,384.									

Figure 12 (National line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+2.4	104.9	106.6	112.4
4	+4.5	50.0	60.8	80.8
8	+6.4	35.3	43.3	56.7
16	+6.3	26.5	31.1	41.7
32	+6.0	19.0	22.7	27.8
64	+6.3	13.2	15.5	20.2
128	+6.5	9.3	11.1	14.4
256	+6.5	6.8	7.9	9.7
512	+6.4	4.7	5.5	7.0
1,024	+6.4	3.1	3.7	4.8
2,048	+6.4	2.2	2.5	3.2
4,096	+6.4	1.6	1.9	2.5
8,192	+6.4	1.1	1.3	1.8
16,384	+6.4	0.8	1.0	1.2

Figure 13 (All poverty lines): Possible types of outcomes from targeting by poverty score

		Targeting segment	
		Targeted	**Non-targeted**
True poverty status	**Below poverty line**	**Inclusion** Under poverty line Correctly Targeted	**Undercoverage** Under poverty line Mistakenly Non-targeted
	Above poverty line	**Leakage** Above poverty line Mistakenly Targeted	**Exclusion** Above poverty line Correctly Non-targeted

Figure 14 (National line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.0	52.4	0.0	45.5	47.6	−92.5
5–9	3.7	50.8	0.0	45.5	49.2	−86.4
10–14	6.6	47.9	0.1	45.4	52.0	−75.5
15–19	10.3	44.2	0.5	45.0	55.3	−61.2
20–24	14.9	39.6	1.0	44.5	59.4	−43.4
25–29	18.8	35.7	2.1	43.5	62.2	−27.3
30–34	25.8	28.7	4.7	40.8	66.6	+3.3
35–39	33.8	20.7	7.5	38.0	71.8	+37.9
40–44	40.1	14.3	10.3	35.2	75.3	+66.3
45–49	45.2	9.3	14.5	31.0	76.2	+73.4
50–54	49.0	5.5	21.0	24.5	73.5	+61.5
55–59	52.2	2.3	27.3	18.3	70.4	+50.0
60–64	53.3	1.2	32.7	12.8	66.1	+40.0
65–69	54.3	0.2	38.7	6.8	61.1	+28.9
70–74	54.5	0.0	42.1	3.5	57.9	+22.8
75–79	54.5	0.0	44.2	1.3	55.8	+18.9
80–84	54.5	0.0	45.0	0.5	55.0	+17.3
85–89	54.5	0.0	45.4	0.1	54.6	+16.7
90–94	54.5	0.0	45.5	0.0	54.5	+16.5
95–100	54.5	0.0	45.5	0.0	54.5	+16.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (National line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	100.0	3.7	Only poor targeted
5–9	3.7	100.0	6.8	Only poor targeted
10–14	6.7	98.0	12.1	49.0:1
15–19	10.8	95.4	19.0	20.6:1
20–24	16.0	93.4	27.4	14.3:1
25–29	20.8	90.1	34.5	9.1:1
30–34	30.5	84.6	47.3	5.5:1
35–39	41.3	81.8	62.0	4.5:1
40–44	50.5	79.5	73.7	3.9:1
45–49	59.6	75.7	82.9	3.1:1
50–54	70.0	70.0	89.9	2.3:1
55–59	79.4	65.7	95.7	1.9:1
60–64	86.0	62.0	97.8	1.6:1
65–69	93.1	58.4	99.7	1.4:1
70–74	96.5	56.4	100.0	1.3:1
75–79	98.7	55.2	100.0	1.2:1
80–84	99.5	54.7	100.0	1.2:1
85–89	99.9	54.6	100.0	1.2:1
90–94	100.0	54.5	100.0	1.2:1
95–100	100.0	54.5	100.0	1.2:1

Food Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 (Food line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	95.6
5–9	93.8
10–14	70.1
15–19	78.5
20–24	73.0
25–29	60.6
30–34	56.3
35–39	51.4
40–44	34.2
45–49	19.5
50–54	15.5
55–59	8.6
60–64	3.2
65–69	3.3
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 (Food line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16,384$), 2007 scorecard applied to the 2007 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+12.7	3.9	4.3	5.9
5–9	–6.2	3.1	3.1	3.1
10–14	–22.9	12.2	12.4	12.7
15–19	+2.3	2.9	3.4	4.4
20–24	+12.0	3.1	3.7	4.8
25–29	+5.4	3.3	3.9	5.3
30–34	+3.8	2.2	2.6	3.5
35–39	–1.0	2.0	2.4	3.2
40–44	–5.2	3.8	4.0	4.3
45–49	–3.2	2.6	2.8	3.1
50–54	+1.1	1.5	1.8	2.4
55–59	–1.3	1.4	1.7	2.1
60–64	+2.6	0.3	0.4	0.5
65–69	+1.8	0.5	0.6	0.8
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (Food line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+1.4	63.2	76.8	84.9
4	+0.7	35.8	43.8	57.9
8	−0.3	26.5	32.0	41.0
16	+0.1	18.6	21.7	29.2
32	+0.1	12.6	14.9	21.6
64	−0.1	9.4	10.8	14.2
128	+0.1	6.4	7.3	9.7
256	+0.2	4.6	5.6	7.1
512	+0.2	3.2	3.8	5.1
1,024	+0.2	2.2	2.6	3.6
2,048	+0.2	1.6	1.9	2.5
4,096	+0.2	1.1	1.4	1.8
8,192	+0.2	0.8	1.0	1.3
16,384	+0.2	0.6	0.7	0.9

Figure 12 (Food line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+3.5	102.6	107.4	112.8
4	+6.3	49.8	58.4	77.7
8	+7.8	34.9	41.1	57.0
16	+7.9	25.3	30.2	38.6
32	+7.9	17.7	21.5	28.9
64	+8.0	12.8	15.0	19.8
128	+7.8	9.0	11.1	13.0
256	+7.7	5.9	7.1	9.6
512	+7.8	4.2	5.1	6.5
1,024	+7.7	3.0	3.7	5.0
2,048	+7.7	2.2	2.5	3.5
4,096	+7.7	1.5	1.8	2.3
8,192	+7.7	1.1	1.3	1.6
16,384	+7.7	0.7	0.9	1.2

Figure 14 (Food line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	1.8	31.7	0.3	66.3	68.0	−88.7
5–9	3.4	30.0	0.3	66.3	69.7	−78.7
10–14	6.1	27.3	0.6	65.9	72.1	−61.5
15–19	9.3	24.2	1.5	65.0	74.3	−39.8
20–24	12.6	20.8	3.3	63.2	75.9	−14.6
25–29	15.2	18.2	5.6	60.9	76.1	+7.8
30–34	20.1	13.4	10.4	56.1	76.2	+51.1
35–39	25.6	7.9	15.7	50.8	76.4	+52.9
40–44	28.7	4.8	21.8	44.8	73.5	+34.9
45–49	31.0	2.5	28.7	37.9	68.8	+14.3
50–54	32.5	1.0	37.5	29.0	61.5	−12.2
55–59	33.3	0.2	46.2	20.4	53.6	−37.9
60–64	33.3	0.1	52.7	13.9	47.2	−57.4
65–69	33.5	0.0	59.6	6.9	40.4	−78.1
70–74	33.5	0.0	63.0	3.5	37.0	−88.4
75–79	33.5	0.0	65.2	1.3	34.8	−94.9
80–84	33.5	0.0	66.1	0.5	33.9	−97.4
85–89	33.5	0.0	66.4	0.1	33.6	−98.4
90–94	33.5	0.0	66.5	0.0	33.5	−98.8
95–100	33.5	0.0	66.5	0.0	33.5	−98.8

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (Food line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	86.4	5.3	6.3:1
5–9	3.7	92.4	10.2	12.2:1
10–14	6.7	91.0	18.4	10.2:1
15–19	10.8	85.9	27.8	6.1:1
20–24	16.0	79.2	37.8	3.8:1
25–29	20.8	73.0	45.5	2.7:1
30–34	30.5	65.9	60.1	1.9:1
35–39	41.3	61.9	76.5	1.6:1
40–44	50.5	56.9	85.7	1.3:1
45–49	59.6	51.9	92.5	1.1:1
50–54	70.0	46.4	97.0	0.9:1
55–59	79.4	41.9	99.4	0.7:1
60–64	86.0	38.8	99.6	0.6:1
65–69	93.1	36.0	100.0	0.6:1
70–74	96.5	34.7	100.0	0.5:1
75–79	98.7	33.9	100.0	0.5:1
80–84	99.5	33.6	100.0	0.5:1
85–89	99.9	33.5	100.0	0.5:1
90–94	100.0	33.5	100.0	0.5:1
95–100	100.0	33.5	100.0	0.5:1

150% of the National Poverty Line Tables

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 (150% of the national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	99.9
10–14	100.0
15–19	97.7
20–24	93.2
25–29	87.7
30–34	89.2
35–39	81.5
40–44	82.9
45–49	77.2
50–54	58.8
55–59	49.7
60–64	35.9
65–69	27.4
70–74	20.6
75–79	5.0
80–84	2.3
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 (150% of the national line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	−0.1	0.1	0.1	0.1
10–14	+0.7	0.4	0.4	0.6
15–19	+5.2	1.9	2.3	2.7
20–24	−1.7	1.4	1.5	1.9
25–29	+5.3	2.7	3.1	4.0
30–34	+7.6	1.7	2.0	2.7
35–39	−9.8	5.4	5.5	5.7
40–44	−3.4	2.4	2.6	2.7
45–49	+0.4	2.0	2.3	3.0
50–54	+1.9	2.2	2.6	3.8
55–59	+1.7	2.3	2.7	3.6
60–64	+3.0	2.6	3.1	4.1
65–69	+1.3	2.4	2.8	3.5
70–74	+11.2	2.0	2.5	3.2
75–79	−0.3	1.8	2.1	2.6
80–84	+2.3	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (150% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	+0.3	70.7	80.9	87.4
4	+0.3	33.9	41.0	51.4
8	+0.1	24.8	28.9	38.0
16	+0.2	17.7	20.8	27.2
32	+0.7	12.2	14.0	19.0
64	+0.7	8.4	9.7	12.7
128	+0.8	6.0	6.9	9.1
256	+0.8	4.3	4.9	6.7
512	+0.8	3.1	3.7	4.7
1,024	+0.8	2.1	2.6	3.3
2,048	+0.8	1.5	1.8	2.3
4,096	+0.8	1.0	1.2	1.6
8,192	+0.8	0.8	0.9	1.2
16,384	+0.8	0.5	0.6	0.8

Figure 12 (150% of the national line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

| Sample Size | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	+2.9	103.1	106.9	100.0
4	+5.2	50.5	62.6	77.0
8	+5.9	36.8	43.5	57.0
16	+6.1	26.0	32.6	40.9
32	+5.8	18.9	22.2	28.9
64	+5.6	12.6	14.6	20.1
128	+5.5	8.7	10.6	14.4
256	+5.4	6.4	7.4	9.5
512	+5.5	4.5	5.3	6.9
1,024	+5.4	3.2	3.9	5.0
2,048	+5.5	2.2	2.6	3.3
4,096	+5.5	1.6	1.9	2.4
8,192	+5.5	1.1	1.4	1.6
16,384	+5.4	0.8	0.9	1.2

Figure 14 (150% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.0	65.8	0.0	32.2	34.2	−94.0
5–9	3.7	64.1	0.0	32.2	35.9	−89.1
10–14	6.7	61.1	0.0	32.2	38.9	−80.2
15–19	10.5	57.3	0.3	31.9	42.4	−68.5
20–24	15.4	52.4	0.6	31.6	47.0	−53.8
25–29	19.5	48.3	1.3	30.9	50.4	−40.5
30–34	27.4	40.4	3.0	29.2	56.6	−14.5
35–39	37.1	30.7	4.2	28.0	65.2	+15.8
40–44	44.8	23.0	5.6	26.6	71.4	+40.5
45–49	52.0	15.8	7.7	24.5	76.5	+64.6
50–54	58.2	9.6	11.8	20.4	78.5	+82.5
55–59	62.8	5.0	16.6	15.6	78.3	+75.4
60–64	65.2	2.6	20.8	11.4	76.6	+69.3
65–69	67.2	0.6	25.8	6.4	73.6	+61.9
70–74	67.6	0.2	28.9	3.3	71.0	+57.4
75–79	67.8	0.0	30.9	1.3	69.1	+54.5
80–84	67.8	0.0	31.7	0.5	68.3	+53.2
85–89	67.8	0.0	32.1	0.1	67.9	+52.7
90–94	67.8	0.0	32.2	0.0	67.8	+52.5
95–100	67.8	0.0	32.2	0.0	67.8	+52.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (150% of the national line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	100.0	3.0	Only poor targeted
5–9	3.7	100.0	5.5	Only poor targeted
10–14	6.7	99.3	9.9	139.3:1
15–19	10.8	97.3	15.5	36.0:1
20–24	16.0	96.2	22.6	25.5:1
25–29	20.8	93.7	28.8	14.8:1
30–34	30.5	90.0	40.5	9.0:1
35–39	41.3	89.9	54.8	8.9:1
40–44	50.5	88.8	66.1	7.9:1
45–49	59.6	87.1	76.6	6.8:1
50–54	70.0	83.1	85.8	4.9:1
55–59	79.4	79.0	92.6	3.8:1
60–64	86.0	75.8	96.2	3.1:1
65–69	93.1	72.2	99.2	2.6:1
70–74	96.5	70.1	99.8	2.3:1
75–79	98.7	68.7	100.0	2.2:1
80–84	99.5	68.1	100.0	2.1:1
85–89	99.9	67.9	100.0	2.1:1
90–94	100.0	67.8	100.0	2.1:1
95–100	100.0	67.8	100.0	2.1:1

200% of the National Poverty Line Tables

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 (200% of the national line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	100.0
5–9	99.9
10–14	100.0
15–19	100.0
20–24	95.2
25–29	93.9
30–34	96.3
35–39	85.6
40–44	88.7
45–49	82.9
50–54	73.6
55–59	61.3
60–64	55.2
65–69	48.9
70–74	29.5
75–79	10.1
80–84	13.1
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 (200% of the national line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16,384$), 2007 scorecard applied to the 2007 validation sample

		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
Score	Diff.	90-percent	95-percent	99-percent
0–4	+0.0	0.0	0.0	0.0
5–9	−0.1	0.1	0.1	0.1
10–14	+0.0	0.0	0.0	0.0
15–19	+5.4	1.7	2.0	2.6
20–24	−2.2	1.5	1.5	1.6
25–29	−5.3	2.8	2.9	2.9
30–34	+9.3	1.5	1.8	2.4
35–39	−8.2	4.5	4.6	4.7
40–44	−4.3	2.6	2.7	2.9
45–49	−1.2	1.8	2.2	2.9
50–54	+3.8	2.2	2.6	3.6
55–59	−4.3	3.3	3.5	4.1
60–64	+9.7	2.8	3.2	4.3
65–69	+6.4	2.8	3.3	4.4
70–74	+13.7	2.6	3.1	3.9
75–79	−1.7	2.7	3.1	4.2
80–84	−1.7	5.0	6.1	7.7
85–89	−8.5	7.2	7.7	9.3
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (200% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−0.9	59.2	68.3	88.3
4	+0.7	30.8	37.0	46.7
8	+0.3	20.9	24.7	33.2
16	+0.3	16.0	19.5	23.5
32	+0.7	11.4	13.8	17.7
64	+0.6	8.0	9.3	12.9
128	+0.7	5.4	6.4	8.2
256	+0.7	3.9	4.6	6.2
512	+0.7	2.8	3.3	4.1
1,024	+0.7	2.0	2.4	3.0
2,048	+0.7	1.4	1.8	2.3
4,096	+0.7	1.0	1.2	1.7
8,192	+0.7	0.7	0.8	1.2
16,384	+0.7	0.5	0.6	0.8

Figure 12 (200% of the national line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+3.8	101.6	105.4	111.3
4	+3.9	48.1	59.8	81.0
8	+4.6	34.3	41.2	54.6
16	+4.9	24.1	28.9	40.5
32	+4.4	18.2	21.7	29.5
64	+4.3	12.6	14.9	19.6
128	+4.3	8.2	10.1	13.4
256	+4.2	6.2	7.2	9.3
512	+4.3	4.3	5.3	6.5
1,024	+4.2	3.0	3.6	4.7
2,048	+4.2	2.3	2.6	3.5
4,096	+4.2	1.5	1.8	2.6
8,192	+4.2	1.1	1.3	1.7
16,384	+4.2	0.8	0.9	1.2

Figure 14 (200% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.0	74.2	0.0	23.7	25.8	−94.7
5–9	3.7	72.6	0.0	23.7	27.4	−90.3
10–14	6.7	69.5	0.0	23.7	30.5	−82.3
15–19	10.7	65.6	0.1	23.6	34.3	−71.8
20–24	15.6	60.7	0.3	23.4	39.0	−58.6
25–29	20.4	55.8	0.4	23.3	43.8	−45.9
30–34	29.0	47.3	1.5	22.2	51.2	−22.0
35–39	39.0	37.3	2.4	21.4	60.4	+5.3
40–44	47.2	29.0	3.2	20.5	67.8	+28.1
45–49	55.2	21.1	4.5	19.3	74.4	+50.5
50–54	62.6	13.7	7.4	16.3	78.9	+73.8
55–59	68.9	7.4	10.6	13.2	82.1	+86.2
60–64	72.2	4.1	13.8	9.9	82.1	+81.9
65–69	75.0	1.2	18.0	5.7	80.8	+76.4
70–74	75.7	0.5	20.8	3.0	78.7	+72.8
75–79	76.1	0.2	22.6	1.2	77.3	+70.4
80–84	76.2	0.0	23.3	0.4	76.7	+69.5
85–89	76.3	0.0	23.6	0.1	76.4	+69.1
90–94	76.3	0.0	23.7	0.0	76.3	+68.9
95–100	76.3	0.0	23.7	0.0	76.3	+68.9

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (200% of the national line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	100.0	2.7	Only poor targeted
5–9	3.7	100.0	4.9	Only poor targeted
10–14	6.7	100.0	8.8	26,089.5:1
15–19	10.8	98.6	14.0	72.6:1
20–24	16.0	97.9	20.5	45.6:1
25–29	20.8	98.0	26.8	49.9:1
30–34	30.5	95.1	38.0	19.2:1
35–39	41.3	94.3	51.1	16.5:1
40–44	50.5	93.6	62.0	14.7:1
45–49	59.6	92.5	72.3	12.3:1
50–54	70.0	89.4	82.1	8.5:1
55–59	79.4	86.7	90.3	6.5:1
60–64	86.0	83.9	94.6	5.2:1
65–69	93.1	80.6	98.4	4.2:1
70–74	96.5	78.5	99.3	3.6:1
75–79	98.7	77.1	99.8	3.4:1
80–84	99.5	76.6	99.9	3.3:1
85–89	99.9	76.4	100.0	3.2:1
90–94	100.0	76.3	100.0	3.2:1
95–100	100.0	76.3	100.0	3.2:1

USAID "Extreme" Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 (USAID "extreme" line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	75.7
5–9	64.1
10–14	60.7
15–19	49.5
20–24	39.0
25–29	44.1
30–34	42.6
35–39	41.4
40–44	29.1
45–49	21.5
50–54	13.0
55–59	8.0
60–64	2.8
65–69	5.0
70–74	0.0
75–79	5.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 (USAID "extreme" line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval ($+/-$ percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+18.5	4.8	5.9	7.5
5–9	−31.7	16.7	16.8	17.0
10–14	−15.0	9.0	9.2	9.9
15–19	−6.1	4.6	4.9	5.7
20–24	−14.3	8.7	9.0	9.5
25–29	+1.1	3.3	3.8	5.2
30–34	−6.1	4.2	4.3	4.9
35–39	+6.3	2.0	2.5	3.1
40–44	+4.9	1.9	2.4	3.4
45–49	−2.7	2.3	2.5	3.0
50–54	+0.8	1.4	1.6	2.2
55–59	−1.9	1.7	1.8	2.1
60–64	+1.3	0.5	0.6	0.8
65–69	+1.9	0.8	1.0	1.3
70–74	+0.0	0.0	0.0	0.0
75–79	+5.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	+0.4	57.5	64.0	84.6
4	−0.3	36.3	42.5	52.7
8	−1.6	25.5	29.8	39.7
16	−1.4	18.3	21.4	29.5
32	−1.4	12.5	14.9	21.0
64	−1.3	9.1	10.9	13.9
128	−1.3	6.6	7.8	9.9
256	−1.3	4.8	5.6	7.9
512	−1.2	3.4	4.1	5.2
1,024	−1.2	2.5	3.0	3.7
2,048	−1.2	1.6	2.0	2.7
4,096	−1.2	1.2	1.4	1.9
8,192	−1.3	0.8	1.0	1.2
16,384	−1.2	0.6	0.7	0.9

Figure 12 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size n	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
	Diff.	90-percent	95-percent	99-percent
1	+4.7	102.6	105.2	108.7
4	+5.1	49.1	57.6	76.9
8	+6.8	34.5	41.4	56.6
16	+6.8	25.1	29.9	40.2
32	+6.9	17.6	20.6	27.4
64	+6.8	12.4	14.3	18.2
128	+7.0	8.8	10.3	13.2
256	+6.9	6.1	7.4	9.7
512	+6.9	4.5	5.3	7.2
1,024	+6.9	3.2	3.8	5.2
2,048	+6.9	2.2	2.7	3.4
4,096	+6.9	1.6	1.9	2.5
8,192	+6.9	1.1	1.3	1.8
16,384	+6.9	0.8	0.9	1.3

Figure 14 (USAID "extreme" line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	1.2	25.7	0.8	72.3	73.5	−87.8
5–9	2.8	24.1	0.9	72.2	75.0	−75.8
10–14	4.8	22.1	1.9	71.1	75.9	−57.1
15–19	6.9	20.1	4.0	69.1	76.0	−34.3
20–24	9.7	17.2	6.3	66.8	76.5	−4.7
25–29	11.8	15.1	9.0	64.0	75.8	+21.3
30–34	16.1	10.8	14.4	58.7	74.7	+46.5
35–39	19.9	7.0	21.5	51.6	71.5	+20.3
40–44	22.0	4.9	28.4	44.6	66.7	−5.6
45–49	24.4	2.5	35.2	37.9	62.3	−30.7
50–54	25.7	1.2	44.3	28.8	54.5	−64.5
55–59	26.5	0.4	52.9	20.2	46.7	−96.4
60–64	26.7	0.2	59.3	13.8	40.5	−120.2
65–69	26.9	0.0	66.1	6.9	33.9	−145.6
70–74	26.9	0.0	69.6	3.5	30.4	−158.4
75–79	26.9	0.0	71.7	1.3	28.3	−166.5
80–84	26.9	0.0	72.6	0.5	27.4	−169.6
85–89	26.9	0.0	72.9	0.1	27.1	−170.8
90–94	26.9	0.0	73.1	0.0	26.9	−171.4
95–100	26.9	0.0	73.1	0.0	26.9	−171.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (USAID "extreme" line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	60.8	4.6	1.6:1
5–9	3.7	75.7	10.4	3.1:1
10–14	6.7	71.1	17.8	2.5:1
15–19	10.8	63.3	25.5	1.7:1
20–24	16.0	60.8	36.0	1.6:1
25–29	20.8	56.6	43.8	1.3:1
30–34	30.5	52.7	59.7	1.1:1
35–39	41.3	48.1	73.8	0.9:1
40–44	50.5	43.7	81.9	0.8:1
45–49	59.6	41.0	90.7	0.7:1
50–54	70.0	36.7	95.4	0.6:1
55–59	79.4	33.4	98.6	0.5:1
60–64	86.0	31.0	99.1	0.4:1
65–69	93.1	28.9	100.0	0.4:1
70–74	96.5	27.9	100.0	0.4:1
75–79	98.7	27.3	100.0	0.4:1
80–84	99.5	27.1	100.0	0.4:1
85–89	99.9	27.0	100.0	0.4:1
90–94	100.0	26.9	100.0	0.4:1
95–100	100.0	26.9	100.0	0.4:1

$1.25/day 2005 PPP Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 ($1.25/day 2005 PPP line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	72.5
5–9	73.4
10–14	53.4
15–19	39.9
20–24	29.1
25–29	19.7
30–34	22.0
35–39	22.2
40–44	3.7
45–49	4.8
50–54	1.9
55–59	0.0
60–64	1.8
65–69	0.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 ($1.25/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+17.4	4.8	5.8	7.1
5–9	+29.5	5.3	6.3	8.8
10–14	−9.4	6.5	6.9	7.7
15–19	−9.8	6.6	6.8	7.2
20–24	−1.0	2.7	3.2	4.0
25–29	+4.0	2.5	3.0	4.4
30–34	−14.7	8.5	8.7	9.1
35–39	+5.4	1.7	2.1	2.6
40–44	−3.0	2.1	2.2	2.5
45–49	−0.2	1.0	1.2	1.6
50–54	−0.6	0.7	0.9	1.1
55–59	−1.7	1.2	1.2	1.3
60–64	+1.2	0.3	0.4	0.5
65–69	+0.0	0.0	0.0	0.0
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

| Sample Size | Difference between estimate and true value | | | |
| | Diff. | Confidence interval (+/− percentage points) | | |
n		90-percent	95-percent	99-percent
1	−0.5	58.9	65.7	84.8
4	−1.1	30.4	36.8	52.4
8	−1.3	22.2	26.1	31.7
16	−0.8	15.5	19.2	26.0
32	−1.0	11.2	12.9	18.0
64	−0.9	8.2	9.7	12.5
128	−0.9	5.7	6.8	8.5
256	−0.9	4.0	4.7	6.1
512	−0.9	3.0	3.5	4.5
1,024	−1.0	2.2	2.5	3.4
2,048	−0.9	1.5	1.8	2.4
4,096	−0.9	1.1	1.3	1.7
8,192	−1.0	0.7	0.9	1.2
16,384	−1.0	0.5	0.7	0.8

Figure 12 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−1.6	100.0	100.1	107.9
4	−0.3	42.5	51.3	71.4
8	−0.0	29.9	35.7	44.8
16	−0.3	20.4	23.5	31.3
32	−0.1	14.5	16.8	22.0
64	−0.2	10.3	12.1	17.2
128	−0.2	7.3	8.7	11.0
256	−0.2	5.0	5.9	8.3
512	−0.2	3.6	4.2	5.7
1,024	−0.3	2.7	3.3	4.3
2,048	−0.3	1.9	2.3	3.1
4,096	−0.3	1.4	1.6	2.1
8,192	−0.2	1.0	1.1	1.3
16,384	−0.3	0.7	0.8	1.0

Figure 14 ($1.25/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	1.2	12.7	0.8	85.2	86.4	−76.7
5–9	2.2	11.7	1.5	84.6	86.8	−57.5
10–14	3.8	10.1	2.9	83.1	86.9	−24.3
15–19	5.7	8.2	5.1	80.9	86.7	+18.6
20–24	7.5	6.5	8.5	77.5	85.0	+39.2
25–29	8.1	5.8	12.7	73.3	81.4	+8.9
30–34	11.0	2.9	19.5	66.6	77.6	−39.3
35–39	12.6	1.3	28.7	57.3	69.9	−105.7
40–44	13.2	0.8	37.3	48.7	61.9	−167.1
45–49	13.6	0.4	46.1	40.0	53.6	−229.9
50–54	13.8	0.2	56.2	29.8	43.6	−302.5
55–59	13.9	0.1	65.5	20.5	34.4	−369.2
60–64	14.0	0.0	72.0	14.0	28.0	−415.8
65–69	14.0	0.0	79.1	6.9	20.9	−466.5
70–74	14.0	0.0	82.5	3.5	17.5	−491.2
75–79	14.0	0.0	84.7	1.3	15.3	−506.7
80–84	14.0	0.0	85.6	0.5	14.4	−512.7
85–89	14.0	0.0	85.9	0.1	14.1	−515.1
90–94	14.0	0.0	86.0	0.0	14.0	−516.1
95–100	14.0	0.0	86.0	0.0	14.0	−516.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($1.25/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	59.8	8.7	1.5:1
5–9	3.7	60.2	16.0	1.5:1
10–14	6.7	56.6	27.3	1.3:1
15–19	10.8	52.9	41.0	1.1:1
20–24	16.0	46.8	53.4	0.9:1
25–29	20.8	39.0	58.1	0.6:1
30–34	30.5	36.2	79.0	0.6:1
35–39	41.3	30.5	90.4	0.4:1
40–44	50.5	26.1	94.3	0.4:1
45–49	59.6	22.8	97.2	0.3:1
50–54	70.0	19.7	98.7	0.2:1
55–59	79.4	17.5	99.6	0.2:1
60–64	86.0	16.2	100.0	0.2:1
65–69	93.1	15.0	100.0	0.2:1
70–74	96.5	14.5	100.0	0.2:1
75–79	98.7	14.2	100.0	0.2:1
80–84	99.5	14.0	100.0	0.2:1
85–89	99.9	14.0	100.0	0.2:1
90–94	100.0	14.0	100.0	0.2:1
95–100	100.0	14.0	100.0	0.2:1

$2.50/day 2005 PPP Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 ($2.50/day 2005 PPP line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	78.8
5–9	93.8
10–14	70.0
15–19	76.4
20–24	67.5
25–29	52.9
30–34	48.8
35–39	47.8
40–44	28.5
45–49	18.0
50–54	14.4
55–59	6.8
60–64	2.5
65–69	5.0
70–74	0.0
75–79	0.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 ($2.50/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+16.0	4.9	5.8	7.2
5–9	−6.2	3.1	3.1	3.1
10–14	−19.4	10.7	10.9	11.2
15–19	+0.2	2.9	3.4	4.4
20–24	+7.1	3.0	3.7	4.7
25–29	+8.5	3.3	4.0	5.3
30–34	−0.7	2.3	2.6	3.4
35–39	+2.9	2.0	2.4	3.3
40–44	−9.9	6.1	6.3	6.7
45–49	−4.1	3.0	3.2	3.6
50–54	+2.8	1.4	1.6	2.1
55–59	−3.6	2.6	2.7	2.9
60–64	+1.9	0.3	0.4	0.5
65–69	+1.9	0.8	1.0	1.3
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+0.7	62.2	74.8	86.5
4	−0.0	35.3	41.3	56.2
8	−0.9	26.3	30.6	41.8
16	−0.5	19.0	21.9	29.4
32	−0.5	12.7	14.9	19.7
64	−0.5	9.1	11.0	14.0
128	−0.5	6.4	7.5	10.2
256	−0.4	4.5	5.5	7.0
512	−0.4	3.1	3.9	5.2
1,024	−0.4	2.3	2.8	3.8
2,048	−0.4	1.6	1.9	2.6
4,096	−0.4	1.1	1.4	1.9
8,192	−0.4	0.8	1.0	1.3
16,384	−0.4	0.6	0.7	0.9

Figure 12 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	−2.2	102.0	105.3	112.8
4	+1.0	49.9	60.6	80.2
8	+2.5	34.1	42.4	56.0
16	+2.2	26.1	31.3	40.0
32	+2.3	18.3	22.2	29.7
64	+2.3	12.8	15.0	18.9
128	+2.3	8.9	10.5	13.7
256	+2.2	6.1	7.5	9.9
512	+2.3	4.4	5.2	7.0
1,024	+2.2	3.1	3.8	4.9
2,048	+2.2	2.2	2.6	3.5
4,096	+2.2	1.6	1.9	2.4
8,192	+2.2	1.1	1.3	1.7
16,384	+2.2	0.8	0.9	1.3

Figure 14 ($2.50/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	1.4	29.6	0.6	68.4	69.8	−88.9
5–9	3.1	27.9	0.6	68.3	71.4	−78.2
10–14	5.6	25.4	1.1	67.9	73.5	−60.1
15–19	8.8	22.2	2.0	66.9	75.7	−36.8
20–24	12.1	19.0	3.9	65.1	77.2	−9.7
25–29	14.3	16.7	6.6	62.4	76.7	+13.3
30–34	18.9	12.1	11.6	57.4	76.3	+59.2
35–39	23.6	7.4	17.8	51.2	74.8	+42.7
40–44	26.5	4.5	24.0	45.0	71.5	+22.7
45–49	28.6	2.4	31.0	38.0	66.6	−0.0
50–54	29.8	1.2	40.2	28.8	58.7	−29.5
55–59	30.7	0.3	48.7	20.3	51.0	−57.1
60–64	30.8	0.2	55.2	13.8	44.5	−78.0
65–69	31.0	0.0	62.0	6.9	38.0	−100.1
70–74	31.0	0.0	65.5	3.5	34.5	−111.2
75–79	31.0	0.0	67.7	1.3	32.3	−118.2
80–84	31.0	0.0	68.5	0.5	31.5	−120.9
85–89	31.0	0.0	68.8	0.1	31.2	−122.0
90–94	31.0	0.0	69.0	0.0	31.0	−122.4
95–100	31.0	0.0	69.0	0.0	31.0	−122.4

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($2.50/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	68.8	4.5	2.2:1
5–9	3.7	82.8	9.9	4.8:1
10–14	6.7	83.4	18.1	5.0:1
15–19	10.8	81.1	28.3	4.3:1
20–24	16.0	75.6	38.9	3.1:1
25–29	20.8	68.6	46.1	2.2:1
30–34	30.5	61.9	60.9	1.6:1
35–39	41.3	57.0	76.0	1.3:1
40–44	50.5	52.5	85.4	1.1:1
45–49	59.6	48.0	92.2	0.9:1
50–54	70.0	42.6	96.2	0.7:1
55–59	79.4	38.7	99.0	0.6:1
60–64	86.0	35.8	99.2	0.6:1
65–69	93.1	33.3	100.0	0.5:1
70–74	96.5	32.1	100.0	0.5:1
75–79	98.7	31.4	100.0	0.5:1
80–84	99.5	31.2	100.0	0.5:1
85–89	99.9	31.1	100.0	0.5:1
90–94	100.0	31.0	100.0	0.4:1
95–100	100.0	31.0	100.0	0.4:1

$3.75/day 2005 PPP Poverty Line

2007 Scorecard Applied to 2007 Validation Sample

Figure 5 ($3.75/day 2005 PPP line): Estimated poverty likelihoods associated with scores

If a household's score is . . .	. . . then the likelihood (%) of being below the poverty line is:
0–4	95.6
5–9	93.8
10–14	81.5
15–19	87.6
20–24	76.5
25–29	65.3
30–34	74.4
35–39	61.5
40–44	47.3
45–49	34.6
50–54	25.4
55–59	17.7
60–64	10.0
65–69	8.1
70–74	2.1
75–79	5.0
80–84	0.0
85–89	0.0
90–94	0.0
95–100	0.0

Figure 8 ($3.75/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2007 validation sample

| Score | Diff. | Difference between estimate and true value Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+1.1	2.0	2.5	3.3
5–9	−6.2	3.1	3.1	3.1
10–14	−15.7	8.3	8.4	8.6
15–19	−0.5	2.2	2.5	3.5
20–24	−5.0	3.6	3.8	4.4
25–29	+0.4	3.2	3.8	4.8
30–34	+12.5	2.3	2.7	3.2
35–39	+2.2	2.0	2.4	3.3
40–44	−10.7	6.4	6.6	7.0
45–49	−6.6	4.5	4.7	5.3
50–54	−0.8	1.9	2.1	2.8
55–59	−6.1	4.0	4.2	4.7
60–64	+4.5	1.1	1.3	1.6
65–69	+2.9	1.1	1.3	1.6
70–74	+2.1	0.0	0.0	0.0
75–79	+5.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2007 validation sample

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+1.5	69.9	74.5	88.8
4	+0.2	38.0	43.8	55.7
8	−1.4	27.5	32.8	40.0
16	−1.2	19.1	22.3	28.6
32	−1.0	13.1	15.4	21.0
64	−1.1	8.8	10.8	14.4
128	−1.0	6.5	7.6	10.0
256	−0.9	4.8	5.6	7.5
512	−0.8	3.3	4.1	5.3
1,024	−0.8	2.3	2.8	3.8
2,048	−0.8	1.6	2.0	2.7
4,096	−0.8	1.2	1.4	1.9
8,192	−0.8	0.8	1.0	1.3
16,384	−0.8	0.6	0.7	0.9

Figure 12 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
n		90-percent	95-percent	99-percent
1	−4.2	105.5	106.5	111.6
4	−2.7	54.8	63.5	84.1
8	+0.1	36.5	44.1	59.5
16	+0.1	27.4	32.2	44.2
32	−0.0	19.6	23.1	30.3
64	+0.2	13.7	16.4	21.1
128	+0.4	9.8	11.9	15.1
256	+0.3	7.1	8.3	10.6
512	+0.3	4.8	5.7	8.0
1,024	+0.1	3.3	4.0	5.0
2,048	+0.2	2.2	2.7	3.6
4,096	+0.2	1.6	2.0	2.8
8,192	+0.2	1.2	1.4	1.8
16,384	+0.2	0.8	1.0	1.3

Figure 14 ($3.75/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2007 validation sample

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	1.9	42.4	0.1	55.6	57.5	−91.1
5–9	3.6	40.7	0.1	55.6	59.2	−83.5
10–14	6.5	37.8	0.3	55.4	61.9	−70.1
15–19	10.1	34.2	0.7	55.0	65.1	−52.8
20–24	14.3	30.0	1.7	54.0	68.3	−31.8
25–29	17.5	26.8	3.4	52.3	69.8	−13.5
30–34	23.4	20.9	7.1	48.6	72.0	+21.6
35–39	29.8	14.5	11.6	44.1	73.9	+60.5
40–44	34.6	9.7	15.9	39.8	74.4	+64.2
45–49	38.5	5.8	21.1	34.6	73.1	+52.3
50–54	41.4	2.9	28.6	27.1	68.5	+35.4
55–59	43.4	0.9	36.1	19.6	63.0	+18.6
60–64	43.9	0.4	42.1	13.6	57.4	+4.9
65–69	44.3	0.0	48.8	6.9	51.2	−10.1
70–74	44.3	0.0	52.2	3.5	47.8	−17.8
75–79	44.3	0.0	54.4	1.3	45.6	−22.7
80–84	44.3	0.0	55.2	0.5	44.8	−24.6
85–89	44.3	0.0	55.5	0.1	44.5	−25.4
90–94	44.3	0.0	55.7	0.0	44.3	−25.7
95–100	44.3	0.0	55.7	0.0	44.3	−25.7

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($3.75/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2007 validation sample

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.0	94.3	4.3	16.5:1
5–9	3.7	96.8	8.1	29.9:1
10–14	6.7	96.2	14.7	25.3:1
15–19	10.8	93.3	22.8	13.8:1
20–24	16.0	89.4	32.2	8.4:1
25–29	20.8	83.8	39.4	5.2:1
30–34	30.5	76.7	52.8	3.3:1
35–39	41.3	72.0	67.2	2.6:1
40–44	50.5	68.6	78.1	2.2:1
45–49	59.6	64.6	86.9	1.8:1
50–54	70.0	59.1	93.4	1.4:1
55–59	79.4	54.6	97.9	1.2:1
60–64	86.0	51.0	99.0	1.0:1
65–69	93.1	47.6	100.0	0.9:1
70–74	96.5	45.9	100.0	0.8:1
75–79	98.7	44.9	100.0	0.8:1
80–84	99.5	44.5	100.0	0.8:1
85–89	99.9	44.4	100.0	0.8:1
90–94	100.0	44.3	100.0	0.8:1
95–100	100.0	44.3	100.0	0.8:1

National Poverty Line

2007 Scorecard Applied to 2005 *Encuesta de Hogares*

Figure 8 (National line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
Score	**Diff.**	**90-percent**	**95-percent**	**99-percent**
0–4	+2.2	1.3	1.5	2.1
5–9	+5.4	2.0	2.4	3.2
10–14	+0.2	1.8	2.2	2.8
15–19	+6.4	1.8	2.2	2.8
20–24	–3.1	2.5	2.7	3.3
25–29	–5.9	4.1	4.3	4.8
30–34	+9.2	2.0	2.4	3.2
35–39	+6.4	2.0	2.3	3.0
40–44	+8.6	2.3	2.8	3.6
45–49	+12.0	2.2	2.6	3.7
50–54	+9.4	2.1	2.5	3.4
55–59	+7.3	2.2	2.6	3.3
60–64	+2.9	1.9	2.3	3.0
65–69	+4.0	1.5	1.9	2.4
70–74	+6.4	1.3	1.6	2.0
75–79	+5.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (National line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+3.7	71.5	76.7	91.9
4	+3.9	36.0	41.6	54.1
8	+5.2	25.4	29.6	39.3
16	+5.4	19.9	23.3	30.0
32	+5.6	14.1	16.5	21.0
64	+5.7	9.9	11.4	15.4
128	+6.0	7.0	8.1	10.0
256	+6.0	4.9	5.9	7.8
512	+6.0	3.4	4.0	5.8
1,024	+5.9	2.3	2.7	3.8
2,048	+6.0	1.6	2.0	2.6
4,096	+6.0	1.2	1.4	1.8
8,192	+6.0	0.8	1.0	1.3
16,384	+6.0	0.6	0.7	0.9

Figure 12 (National line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+2.4	104.9	106.6	112.4
4	+4.5	50.0	60.8	80.8
8	+6.4	35.3	43.3	56.7
16	+6.3	26.5	31.1	41.7
32	+6.0	19.0	22.7	27.8
64	+6.3	13.2	15.5	20.2
128	+6.5	9.3	11.1	14.4
256	+6.5	6.8	7.9	9.7
512	+6.4	4.7	5.5	7.0
1,024	+6.4	3.1	3.7	4.8
2,048	+6.4	2.2	2.5	3.2
4,096	+6.4	1.6	1.9	2.5
8,192	+6.4	1.1	1.3	1.8
16,384	+6.4	0.8	1.0	1.2

Figure 14 (National line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.7	51.0	0.1	46.3	49.0	−89.9
5–9	5.1	48.6	0.2	46.2	51.2	−80.7
10–14	8.5	45.1	0.5	45.9	54.4	−67.3
15–19	13.6	40.1	1.2	45.1	58.7	−47.2
20–24	19.1	34.6	1.9	44.4	63.5	−25.3
25–29	23.6	30.0	3.3	43.0	66.7	−5.7
30–34	31.0	22.7	6.3	40.0	71.0	+27.2
35–39	37.8	15.8	10.1	36.3	74.1	+59.8
40–44	43.7	10.0	14.6	31.8	75.5	+72.9
45–49	47.9	5.8	20.3	26.1	74.0	+62.3
50–54	50.8	2.9	26.8	19.5	70.3	+50.0
55–59	52.5	1.2	33.1	13.2	65.7	+38.2
60–64	53.2	0.5	38.0	8.3	61.5	+29.1
65–69	53.5	0.1	41.6	4.8	58.3	+22.5
70–74	53.7	0.0	44.0	2.3	56.0	+18.0
75–79	53.7	0.0	45.5	0.9	54.5	+15.3
80–84	53.7	0.0	46.1	0.2	53.9	+14.0
85–89	53.7	0.0	46.3	0.0	53.7	+13.6
90–94	53.7	0.0	46.3	0.0	53.7	+13.6
95–100	53.7	0.0	46.3	0.0	53.7	+13.6

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (National line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	98.1	5.0	51.1:1
5–9	5.3	96.4	9.5	26.4:1
10–14	9.0	94.6	15.9	17.4:1
15–19	14.8	91.8	25.3	11.2:1
20–24	21.0	90.8	35.5	9.9:1
25–29	27.0	87.7	44.1	7.1:1
30–34	37.3	83.0	57.7	4.9:1
35–39	47.9	79.0	70.5	3.8:1
40–44	58.2	75.0	81.4	3.0:1
45–49	68.1	70.3	89.2	2.4:1
50–54	77.6	65.4	94.7	1.9:1
55–59	85.6	61.3	97.8	1.6:1
60–64	91.2	58.3	99.2	1.4:1
65–69	95.1	56.3	99.8	1.3:1
70–74	97.7	54.9	100.0	1.2:1
75–79	99.1	54.1	100.0	1.2:1
80–84	99.8	53.8	100.0	1.2:1
85–89	100.0	53.7	100.0	1.2:1
90–94	100.0	53.7	100.0	1.2:1
95–100	100.0	53.7	100.0	1.2:1

Food Poverty Line

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 (Food line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Diff.	Difference between estimate and true value Confidence interval (+/− percentage points) 90-percent	95-percent	99-percent
0–4	+0.7	1.7	2.0	2.8
5–9	+2.4	2.4	2.8	3.6
10–14	−6.0	4.7	4.9	5.7
15–19	+1.4	2.4	2.9	4.0
20–24	+11.2	2.8	3.4	4.4
25–29	+19.0	2.9	3.4	4.2
30–34	+16.6	2.3	2.7	3.6
35–39	+8.7	2.3	2.6	3.7
40–44	+10.6	1.9	2.3	2.9
45–49	+7.3	1.4	1.7	2.2
50–54	+10.5	0.8	1.0	1.4
55–59	+5.4	0.8	0.9	1.2
60–64	+1.4	0.7	0.8	1.1
65–69	+3.0	0.2	0.3	0.3
70–74	−0.2	0.2	0.2	0.3
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (Food line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+5.0	63.2	76.8	91.4
4	+7.0	35.0	41.0	51.1
8	+7.5	24.3	29.3	38.1
16	+7.9	17.8	20.8	26.4
32	+7.9	12.3	15.3	19.5
64	+7.9	8.5	10.1	13.1
128	+7.9	6.0	7.1	9.7
256	+7.9	4.1	4.9	7.0
512	+8.0	2.9	3.6	4.9
1,024	+7.9	2.1	2.5	3.1
2,048	+7.9	1.4	1.7	2.3
4,096	+7.9	1.0	1.2	1.7
8,192	+7.8	0.7	0.8	1.1
16,384	+7.9	0.5	0.6	0.8

Figure 12 (Food line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	+3.5	102.6	107.4	112.8
4	+6.3	49.8	58.4	77.7
8	+7.8	34.9	41.1	57.0
16	+7.9	25.3	30.2	38.6
32	+7.9	17.7	21.5	28.9
64	+8.0	12.8	15.0	19.8
128	+7.8	9.0	11.1	13.0
256	+7.7	5.9	7.1	9.6
512	+7.8	4.2	5.1	6.5
1,024	+7.7	3.0	3.7	5.0
2,048	+7.7	2.2	2.5	3.5
4,096	+7.7	1.5	1.8	2.3
8,192	+7.7	1.1	1.3	1.6
16,384	+7.7	0.7	0.9	1.2

Figure 14 (Food line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.6	29.9	0.2	67.3	69.9	−83.7
5–9	4.9	27.7	0.4	67.1	71.9	−68.8
10–14	7.7	24.8	1.3	66.2	74.0	−48.5
15–19	12.1	20.4	2.7	64.8	76.9	−17.4
20–24	16.2	16.3	4.8	62.7	78.8	+14.3
25–29	19.0	13.5	8.0	59.5	78.5	+41.3
30–34	23.2	9.3	14.0	53.4	76.7	+56.8
35–39	27.4	5.1	20.5	46.9	74.3	+36.8
40–44	29.9	2.6	28.3	39.2	69.1	+12.9
45–49	31.3	1.2	36.8	30.6	61.9	−13.3
50–54	32.0	0.5	45.6	21.9	53.8	−40.3
55–59	32.3	0.2	53.3	14.2	46.5	−63.9
60–64	32.5	0.0	58.8	8.7	41.2	−80.7
65–69	32.5	0.0	62.6	4.9	37.4	−92.6
70–74	32.5	0.0	65.1	2.3	34.9	−100.4
75–79	32.5	0.0	66.6	0.9	33.4	−104.8
80–84	32.5	0.0	67.3	0.2	32.7	−106.9
85–89	32.5	0.0	67.5	0.0	32.5	−107.5
90–94	32.5	0.0	67.5	0.0	32.5	−107.5
95–100	32.5	0.0	67.5	0.0	32.5	−107.5

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (Food line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	94.0	7.9	15.6:1
5–9	5.3	92.0	15.0	11.6:1
10–14	9.0	86.0	23.8	6.1:1
15–19	14.8	81.9	37.2	4.5:1
20–24	21.0	77.0	49.7	3.4:1
25–29	27.0	70.5	58.4	2.4:1
30–34	37.3	62.3	71.5	1.7:1
35–39	47.9	57.1	84.2	1.3:1
40–44	58.2	51.4	92.0	1.1:1
45–49	68.1	45.9	96.2	0.8:1
50–54	77.6	41.2	98.3	0.7:1
55–59	85.6	37.8	99.4	0.6:1
60–64	91.2	35.6	99.9	0.6:1
65–69	95.1	34.2	100.0	0.5:1
70–74	97.7	33.3	100.0	0.5:1
75–79	99.1	32.8	100.0	0.5:1
80–84	99.8	32.6	100.0	0.5:1
85–89	100.0	32.5	100.0	0.5:1
90–94	100.0	32.5	100.0	0.5:1
95–100	100.0	32.5	100.0	0.5:1

150% of the National Poverty Line Tables

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 (150% of the national line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	+2.1	1.4	1.5	2.1
5–9	+3.9	1.8	2.1	2.6
10–14	+2.0	0.8	1.0	1.3
15–19	+1.5	1.1	1.3	1.7
20–24	−3.1	2.1	2.2	2.4
25–29	−1.5	1.8	2.0	2.7
30–34	+3.3	1.5	2.0	2.7
35–39	+0.4	1.7	2.0	2.6
40–44	+8.8	2.1	2.4	3.2
45–49	+20.7	2.3	2.8	3.7
50–54	+8.6	2.4	2.9	3.7
55–59	+5.7	2.6	3.1	4.3
60–64	+12.0	2.5	3.1	3.9
65–69	+11.3	2.4	2.7	3.6
70–74	+4.7	3.4	4.1	5.2
75–79	+5.0	0.0	0.0	0.0
80–84	−9.1	7.5	8.3	9.4
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (150% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

| Sample Size n | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
1	+3.2	66.6	75.9	80.9
4	+5.6	34.9	41.9	54.9
8	+6.0	26.4	30.4	39.3
16	+6.3	18.9	22.5	28.6
32	+6.5	13.8	16.3	20.6
64	+6.3	9.5	11.3	14.0
128	+6.3	6.4	7.9	11.2
256	+6.2	4.8	5.6	7.4
512	+6.3	3.4	4.1	5.3
1,024	+6.3	2.3	3.0	4.0
2,048	+6.3	1.6	2.0	2.6
4,096	+6.3	1.1	1.3	1.8
8,192	+6.3	0.8	1.0	1.3
16,384	+6.3	0.6	0.7	0.9

Figure 12 (150% of the national line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	+2.9	103.1	106.9	100.0
4	+5.2	50.5	62.6	77.0
8	+5.9	36.8	43.5	57.0
16	+6.1	26.0	32.6	40.9
32	+5.8	18.9	22.2	28.9
64	+5.6	12.6	14.6	20.1
128	+5.5	8.7	10.6	14.4
256	+5.4	6.4	7.4	9.5
512	+5.5	4.5	5.3	6.9
1,024	+5.4	3.2	3.9	5.0
2,048	+5.5	2.2	2.6	3.3
4,096	+5.5	1.6	1.9	2.4
8,192	+5.5	1.1	1.4	1.6
16,384	+5.4	0.8	0.9	1.2

Figure 14 (150% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.7	65.0	0.0	32.2	34.9	−92.0
5–9	5.1	62.6	0.1	32.2	37.3	−84.6
10–14	8.7	59.0	0.3	32.0	40.8	−73.8
15–19	14.3	53.4	0.5	31.8	46.1	−57.1
20–24	20.2	47.5	0.8	31.5	51.7	−39.1
25–29	25.5	42.2	1.4	30.9	56.4	−22.5
30–34	34.4	33.3	2.9	29.4	63.7	+5.9
35–39	42.9	24.8	5.0	27.3	70.1	+34.1
40–44	50.5	17.2	7.7	24.6	75.1	+60.6
45–49	56.6	11.1	11.5	20.8	77.4	+83.0
50–54	61.6	6.1	16.0	16.3	77.8	+76.3
55–59	65.0	2.7	20.6	11.7	76.7	+69.6
60–64	66.5	1.2	24.7	7.5	74.0	+63.4
65–69	67.3	0.4	27.8	4.4	71.7	+58.9
70–74	67.6	0.1	30.0	2.3	69.9	+55.7
75–79	67.6	0.1	31.5	0.8	68.5	+53.5
80–84	67.7	0.0	32.1	0.2	67.9	+52.6
85–89	67.7	0.0	32.3	0.0	67.7	+52.3
90–94	67.7	0.0	32.3	0.0	67.7	+52.3
95–100	67.7	0.0	32.3	0.0	67.7	+52.3

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (150% of the national line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	98.3	4.0	58.0:1
5–9	5.3	97.3	7.6	35.6:1
10–14	9.0	97.1	12.9	33.6:1
15–19	14.8	96.8	21.1	29.8:1
20–24	21.0	96.3	29.9	26.2:1
25–29	27.0	94.8	37.7	18.1:1
30–34	37.3	92.2	50.8	11.8:1
35–39	47.9	89.5	63.3	8.5:1
40–44	58.2	86.8	74.6	6.5:1
45–49	68.1	83.1	83.6	4.9:1
50–54	77.6	79.3	90.9	3.8:1
55–59	85.6	76.0	96.0	3.2:1
60–64	91.2	72.9	98.2	2.7:1
65–69	95.1	70.7	99.4	2.4:1
70–74	97.7	69.3	99.9	2.3:1
75–79	99.1	68.3	99.9	2.2:1
80–84	99.8	67.8	100.0	2.1:1
85–89	100.0	67.7	100.0	2.1:1
90–94	100.0	67.7	100.0	2.1:1
95–100	100.0	67.7	100.0	2.1:1

200% of the National Poverty Line Tables

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 (200% of the national line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = $ 16,384), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

| | | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
Score	Diff.	90-percent	95-percent	99-percent
0–4	+2.1	1.4	1.5	2.1
5–9	+1.7	1.0	1.3	1.7
10–14	+1.2	0.6	0.7	1.0
15–19	+2.6	0.9	1.1	1.3
20–24	−2.5	1.7	1.7	1.9
25–29	−1.8	1.5	1.6	1.9
30–34	+6.5	1.5	1.7	2.5
35–39	−4.8	3.0	3.1	3.3
40–44	+5.1	1.8	2.2	2.8
45–49	+13.5	2.2	2.6	3.4
50–54	+5.1	2.1	2.5	3.6
55–59	+3.8	2.5	2.9	3.7
60–64	+21.2	2.9	3.5	4.5
65–69	+22.0	3.0	3.8	4.9
70–74	+1.0	3.9	4.8	6.2
75–79	−7.9	6.4	7.0	8.0
80–84	−18.3	13.8	14.8	15.7
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (200% of the national line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	+2.9	60.8	66.8	87.5
4	+4.6	34.2	41.9	55.4
8	+4.8	25.7	31.1	37.0
16	+5.1	18.1	22.1	28.4
32	+5.1	13.2	15.7	21.1
64	+4.9	9.5	10.9	13.8
128	+4.9	6.4	7.8	10.6
256	+4.9	4.7	5.6	7.2
512	+5.0	3.2	4.0	5.3
1,024	+4.9	2.2	2.7	3.5
2,048	+4.9	1.7	2.0	2.6
4,096	+4.9	1.1	1.4	1.7
8,192	+4.9	0.8	1.0	1.2
16,384	+4.9	0.6	0.7	0.9

Figure 12 (200% of the national line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+3.8	101.6	105.4	111.3
4	+3.9	48.1	59.8	81.0
8	+4.6	34.3	41.2	54.6
16	+4.9	24.1	28.9	40.5
32	+4.4	18.2	21.7	29.5
64	+4.3	12.6	14.9	19.6
128	+4.3	8.2	10.1	13.4
256	+4.2	6.2	7.2	9.3
512	+4.3	4.3	5.3	6.5
1,024	+4.2	3.0	3.6	4.7
2,048	+4.2	2.3	2.6	3.5
4,096	+4.2	1.5	1.8	2.6
8,192	+4.2	1.1	1.3	1.7
16,384	+4.2	0.8	0.9	1.2

Figure 14 (200% of the national line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.7	73.8	0.0	23.5	26.2	−92.9
5–9	5.2	71.3	0.1	23.4	28.6	−86.3
10–14	8.9	67.6	0.1	23.4	32.2	−76.7
15–19	14.5	62.0	0.3	23.2	37.7	−61.8
20–24	20.5	56.0	0.5	23.0	43.6	−45.7
25–29	26.2	50.3	0.7	22.8	49.0	−30.5
30–34	35.6	40.9	1.7	21.8	57.4	−4.7
35–39	45.1	31.4	2.8	20.7	65.8	+21.6
40–44	53.8	22.7	4.4	19.1	72.9	+46.5
45–49	61.2	15.3	7.0	16.5	77.7	+69.0
50–54	67.6	8.9	10.0	13.5	81.1	+86.9
55–59	72.2	4.3	13.4	10.1	82.3	+82.5
60–64	74.3	2.2	16.9	6.6	80.9	+77.9
65–69	75.5	1.0	19.6	3.9	79.3	+74.3
70–74	76.2	0.3	21.5	2.0	78.2	+71.9
75–79	76.4	0.1	22.8	0.8	77.1	+70.3
80–84	76.5	0.0	23.3	0.2	76.7	+69.5
85–89	76.5	0.0	23.5	0.0	76.5	+69.3
90–94	76.5	0.0	23.5	0.0	76.5	+69.3
95–100	76.5	0.0	23.5	0.0	76.5	+69.3

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (200% of the national line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	98.5	3.5	65.2:1
5–9	5.3	98.3	6.8	56.2:1
10–14	9.0	98.3	11.6	59.3:1
15–19	14.8	97.9	18.9	46.6:1
20–24	21.0	97.7	26.8	43.4:1
25–29	27.0	97.3	34.3	36.4:1
30–34	37.3	95.5	46.6	21.1:1
35–39	47.9	94.1	58.9	16.0:1
40–44	58.2	92.4	70.4	12.2:1
45–49	68.1	89.8	80.0	8.8:1
50–54	77.6	87.1	88.4	6.8:1
55–59	85.6	84.3	94.4	5.4:1
60–64	91.2	81.4	97.1	4.4:1
65–69	95.1	79.3	98.7	3.8:1
70–74	97.7	78.0	99.6	3.5:1
75–79	99.1	77.0	99.8	3.4:1
80–84	99.8	76.7	100.0	3.3:1
85–89	100.0	76.5	100.0	3.3:1
90–94	100.0	76.5	100.0	3.3:1
95–100	100.0	76.5	100.0	3.3:1

USAID "Extreme" Poverty Line

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 (USAID "extreme" line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

| Score | Diff. | Difference between estimate and true value | | |
| | | Confidence interval (+/− percentage points) | | |
		90-percent	95-percent	99-percent
0–4	+1.5	3.8	4.3	5.7
5–9	−6.1	4.9	5.3	5.7
10–14	+6.9	3.5	4.2	5.4
15–19	−3.5	3.3	3.7	4.8
20–24	−1.6	2.8	3.4	4.5
25–29	+9.5	2.7	3.4	4.5
30–34	+19.7	1.8	2.1	2.7
35–39	+5.8	2.3	2.7	3.5
40–44	+8.5	1.8	2.2	2.9
45–49	+6.9	1.5	1.8	2.4
50–54	+5.8	1.2	1.4	1.9
55–59	+1.3	1.3	1.6	2.0
60–64	+1.1	0.7	0.9	1.1
65–69	+4.6	0.2	0.3	0.3
70–74	−0.2	0.2	0.2	0.3
75–79	+5.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

| Sample Size | Difference between estimate and true value | | | |
| | | Confidence interval (+/− percentage points) | | |
n	Diff.	90-percent	95-percent	99-percent
1	+5.1	60.2	69.6	85.4
4	+4.8	35.5	41.8	50.2
8	+5.2	24.3	29.4	36.8
16	+5.4	17.1	20.2	27.4
32	+5.6	12.6	14.9	20.1
64	+5.5	8.5	10.0	14.2
128	+5.6	6.2	7.3	9.1
256	+5.7	4.4	5.0	6.6
512	+5.7	2.9	3.7	5.0
1,024	+5.7	2.2	2.5	3.3
2,048	+5.7	1.6	1.9	2.3
4,096	+5.7	1.1	1.3	1.7
8,192	+5.7	0.7	0.9	1.2
16,384	+5.7	0.5	0.7	0.8

Figure 12 (USAID "extreme" line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	+4.7	102.6	105.2	108.7
4	+5.1	49.1	57.6	76.9
8	+6.8	34.5	41.4	56.6
16	+6.8	25.1	29.9	40.2
32	+6.9	17.6	20.6	27.4
64	+6.8	12.4	14.3	18.2
128	+7.0	8.8	10.3	13.2
256	+6.9	6.1	7.4	9.7
512	+6.9	4.5	5.3	7.2
1,024	+6.9	3.2	3.8	5.2
2,048	+6.9	2.2	2.7	3.4
4,096	+6.9	1.6	1.9	2.5
8,192	+6.9	1.1	1.3	1.8
16,384	+6.9	0.8	0.9	1.3

Figure 14 (USAID "extreme" line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.0	22.2	0.7	75.0	77.0	−80.4
5–9	3.7	20.6	1.6	74.2	77.9	−62.9
10–14	5.5	18.8	3.5	72.2	77.7	−40.2
15–19	8.4	15.9	6.4	69.4	77.7	−4.6
20–24	11.0	13.3	10.0	65.7	76.7	+31.7
25–29	13.2	11.1	13.8	62.0	75.1	+43.2
30–34	15.9	8.4	21.4	54.3	70.2	+11.7
35–39	19.1	5.2	28.8	46.9	66.0	−18.7
40–44	21.2	3.1	37.0	38.7	59.9	−52.5
45–49	22.8	1.5	45.3	30.4	53.2	−86.8
50–54	23.6	0.7	54.0	21.7	45.3	−122.5
55–59	24.1	0.2	61.5	14.2	38.3	−153.5
60–64	24.2	0.0	67.0	8.7	33.0	−176.1
65–69	24.3	0.0	70.9	4.9	29.1	−192.0
70–74	24.3	0.0	73.4	2.3	26.6	−202.4
75–79	24.3	0.0	74.8	0.9	25.2	−208.4
80–84	24.3	0.0	75.5	0.2	24.5	−211.2
85–89	24.3	0.0	75.7	0.0	24.3	−212.0
90–94	24.3	0.0	75.7	0.0	24.3	−212.0
95–100	24.3	0.0	75.7	0.0	24.3	−212.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 (USAID "extreme" line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	74.0	8.3	2.8:1
5–9	5.3	70.3	15.3	2.4:1
10–14	9.0	61.2	22.7	1.6:1
15–19	14.8	56.8	34.6	1.3:1
20–24	21.0	52.3	45.2	1.1:1
25–29	27.0	48.9	54.3	1.0:1
30–34	37.3	42.5	65.4	0.7:1
35–39	47.9	39.9	78.8	0.7:1
40–44	58.2	36.4	87.4	0.6:1
45–49	68.1	33.5	94.0	0.5:1
50–54	77.6	30.4	97.2	0.4:1
55–59	85.6	28.1	99.3	0.4:1
60–64	91.2	26.6	99.8	0.4:1
65–69	95.1	25.5	99.9	0.3:1
70–74	97.7	24.8	100.0	0.3:1
75–79	99.1	24.5	100.0	0.3:1
80–84	99.8	24.3	100.0	0.3:1
85–89	100.0	24.3	100.0	0.3:1
90–94	100.0	24.3	100.0	0.3:1
95–100	100.0	24.3	100.0	0.3:1

$1.25/day 2005 PPP Poverty Line

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 ($1.25/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	−6.6	5.2	5.5	6.3
5–9	−4.2	3.8	4.2	5.9
10–14	+6.7	3.8	4.6	5.8
15–19	−23.0	12.9	13.1	13.7
20–24	−10.6	6.7	7.0	7.7
25–29	−3.8	3.1	3.3	3.7
30–34	+1.1	1.8	2.1	2.8
35–39	+6.4	1.6	1.8	2.5
40–44	−3.5	2.3	2.4	2.6
45–49	+1.3	0.7	0.9	1.1
50–54	+1.0	0.4	0.4	0.6
55–59	−0.9	0.7	0.7	0.8
60–64	+1.6	0.2	0.2	0.3
65–69	−0.2	0.2	0.2	0.3
70–74	+0.0	0.0	0.0	0.0
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−2.1	58.9	66.9	85.3
4	−1.4	27.3	33.4	47.9
8	−1.4	20.2	23.1	29.4
16	−1.2	13.4	15.8	22.2
32	−1.0	9.2	10.7	15.0
64	−1.1	6.7	7.8	10.3
128	−1.2	4.7	5.7	7.5
256	−1.1	3.4	3.9	5.1
512	−1.1	2.4	2.8	3.7
1,024	−1.2	1.6	2.0	2.5
2,048	−1.2	1.2	1.4	1.8
4,096	−1.2	0.8	1.0	1.2
8,192	−1.2	0.6	0.7	0.9
16,384	−1.2	0.4	0.5	0.7

Figure 12 ($1.25/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size		Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−1.6	100.0	100.1	107.9
4	−0.3	42.5	51.3	71.4
8	−0.0	29.9	35.7	44.8
16	−0.3	20.4	23.5	31.3
32	−0.1	14.5	16.8	22.0
64	−0.2	10.3	12.1	17.2
128	−0.2	7.3	8.7	11.0
256	−0.2	5.0	5.9	8.3
512	−0.2	3.6	4.2	5.7
1,024	−0.3	2.7	3.3	4.3
2,048	−0.3	1.9	2.3	3.1
4,096	−0.3	1.4	1.6	2.1
8,192	−0.2	1.0	1.1	1.3
16,384	−0.3	0.7	0.8	1.0

Figure 14 ($1.25/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.2	16.9	0.6	80.4	82.6	−74.2
5–9	4.1	15.0	1.2	79.8	83.8	−50.8
10–14	5.9	13.1	3.1	77.9	83.8	−21.7
15–19	9.2	9.8	5.5	75.4	84.6	+26.0
20–24	11.8	7.2	9.2	71.8	83.6	+51.8
25–29	13.4	5.7	13.6	67.4	80.7	+28.6
30–34	15.7	3.4	21.6	59.4	75.0	−13.5
35–39	17.4	1.6	30.5	50.5	67.9	−60.0
40–44	18.3	0.8	40.0	41.0	59.3	−109.9
45–49	18.8	0.3	49.4	31.6	50.3	−159.3
50–54	18.9	0.1	58.7	22.3	41.1	−208.3
55–59	19.0	0.1	66.6	14.3	33.3	−249.9
60–64	19.0	0.0	72.2	8.8	27.8	−279.2
65–69	19.0	0.0	76.1	4.9	23.9	−299.6
70–74	19.0	0.0	78.6	2.3	21.4	−313.0
75–79	19.0	0.0	80.1	0.9	19.9	−320.6
80–84	19.0	0.0	80.7	0.2	19.3	−324.1
85–89	19.0	0.0	80.9	0.0	19.1	−325.2
90–94	19.0	0.0	80.9	0.0	19.1	−325.2
95–100	19.0	0.0	81.0	0.0	19.0	−325.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($1.25/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	79.1	11.4	3.8:1
5–9	5.3	77.3	21.4	3.4:1
10–14	9.0	65.6	31.0	1.9:1
15–19	14.8	62.4	48.4	1.7:1
20–24	21.0	56.3	62.1	1.3:1
25–29	27.0	49.6	70.2	1.0:1
30–34	37.3	42.1	82.4	0.7:1
35–39	47.9	36.4	91.6	0.6:1
40–44	58.2	31.4	96.0	0.5:1
45–49	68.1	27.5	98.5	0.4:1
50–54	77.6	24.3	99.2	0.3:1
55–59	85.6	22.2	99.7	0.3:1
60–64	91.2	20.9	99.9	0.3:1
65–69	95.1	20.0	100.0	0.3:1
70–74	97.7	19.5	100.0	0.2:1
75–79	99.1	19.2	100.0	0.2:1
80–84	99.8	19.1	100.0	0.2:1
85–89	100.0	19.0	100.0	0.2:1
90–94	100.0	19.0	100.0	0.2:1
95–100	100.0	19.0	100.0	0.2:1

$2.50/day 2005 PPP Poverty Line

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 ($2.50/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16{,}384$), 2007 scorecard applied to the 2005 _Encuesta de Hogares_

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	−17.0	9.2	9.4	9.6
5–9	+1.9	2.3	2.8	3.5
10–14	−13.7	8.1	8.4	8.6
15–19	−1.1	2.4	2.9	4.2
20–24	+5.3	2.9	3.4	4.3
25–29	+2.7	3.0	3.5	4.5
30–34	+7.3	2.3	2.7	3.6
35–39	+1.2	2.3	2.7	3.7
40–44	+1.7	2.0	2.4	3.2
45–49	+2.3	1.6	1.8	2.5
50–54	+6.7	1.2	1.4	2.0
55–59	−0.0	1.3	1.6	2.1
60–64	+0.8	0.7	0.9	1.1
65–69	+4.5	0.3	0.3	0.4
70–74	−0.6	0.5	0.5	0.6
75–79	+0.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−1.4	62.2	74.8	85.7
4	+1.0	35.3	41.9	53.5
8	+1.6	25.5	29.3	39.1
16	+1.7	18.0	21.9	27.4
32	+1.8	12.5	15.2	21.5
64	+1.7	8.7	10.3	14.4
128	+1.8	6.3	7.5	9.8
256	+1.8	4.5	5.4	6.9
512	+1.9	3.0	3.7	4.9
1,024	+1.8	2.2	2.6	3.4
2,048	+1.8	1.6	1.8	2.5
4,096	+1.8	1.1	1.3	1.8
8,192	+1.8	0.7	0.8	1.2
16,384	+1.8	0.5	0.6	0.8

Figure 12 ($2.50/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size n	Diff.	Difference between estimate and true value		
		Confidence interval (+/= percentage points)		
		90-percent	95-percent	99-percent
1	−2.2	102.0	105.3	112.8
4	+1.0	49.9	60.6	80.2
8	+2.5	34.1	42.4	56.0
16	+2.2	26.1	31.3	40.0
32	+2.3	18.3	22.2	29.7
64	+2.3	12.8	15.0	18.9
128	+2.3	8.9	10.5	13.7
256	+2.2	6.1	7.5	9.9
512	+2.3	4.4	5.2	7.0
1,024	+2.2	3.1	3.8	4.9
2,048	+2.2	2.2	2.6	3.5
4,096	+2.2	1.6	1.9	2.4
8,192	+2.2	1.1	1.3	1.7
16,384	+2.2	0.8	0.9	1.3

Figure 14 ($2.50/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.6	32.2	0.1	65.0	67.6	−84.7
5–9	4.9	29.9	0.4	64.8	69.7	−70.7
10–14	7.9	26.9	1.1	64.1	72.0	−51.4
15–19	12.3	22.5	2.5	62.7	75.0	−22.3
20–24	16.4	18.4	4.6	60.6	77.1	+7.5
25–29	19.7	15.2	7.3	57.9	77.6	+33.9
30–34	24.2	10.6	13.1	52.1	76.2	+62.4
35–39	28.7	6.2	19.3	45.9	74.6	+44.7
40–44	31.5	3.4	26.8	38.4	69.9	+23.2
45–49	33.2	1.6	34.9	30.3	63.5	−0.2
50–54	34.1	0.7	43.5	21.7	55.8	−24.9
55–59	34.6	0.2	51.0	14.2	48.8	−46.4
60–64	34.8	0.1	56.5	8.7	43.5	−62.1
65–69	34.8	0.0	60.3	4.8	39.6	−73.2
70–74	34.8	0.0	62.8	2.3	37.2	−80.4
75–79	34.8	0.0	64.3	0.9	35.7	−84.5
80–84	34.8	0.0	65.0	0.2	35.0	−86.5
85–89	34.8	0.0	65.2	0.0	34.8	−87.0
90–94	34.8	0.0	65.2	0.0	34.8	−87.0
95–100	34.8	0.0	65.2	0.0	34.8	−87.1

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($2.50/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	94.9	7.5	18.7:1
5–9	5.3	92.9	14.1	13.1:1
10–14	9.0	88.0	22.8	7.4:1
15–19	14.8	83.4	35.4	5.0:1
20–24	21.0	78.3	47.2	3.6:1
25–29	27.0	73.0	56.5	2.7:1
30–34	37.3	64.8	69.4	1.8:1
35–39	47.9	59.8	82.3	1.5:1
40–44	58.2	54.1	90.4	1.2:1
45–49	68.1	48.8	95.4	1.0:1
50–54	77.6	43.9	97.9	0.8:1
55–59	85.6	40.5	99.4	0.7:1
60–64	91.2	38.1	99.8	0.6:1
65–69	95.1	36.6	99.9	0.6:1
70–74	97.7	35.7	100.0	0.6:1
75–79	99.1	35.1	100.0	0.5:1
80–84	99.8	34.9	100.0	0.5:1
85–89	100.0	34.8	100.0	0.5:1
90–94	100.0	34.8	100.0	0.5:1
95–100	100.0	34.8	100.0	0.5:1

$3.75/day 2005 PPP Poverty Line

2007 Scorecard Applied to the 2005 *Encuesta de Hogares*

Figure 8 ($3.75/day 2005 PPP line): Bootstrapped differences between estimated and true household poverty likelihoods with confidence intervals in a large sample ($n = 16,384$), 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Diff.	Difference between estimate and true value		
		Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
0–4	−2.3	1.8	1.9	2.1
5–9	+0.5	2.2	2.6	3.3
10–14	−9.8	5.8	6.0	6.3
15–19	+0.4	1.9	2.3	2.9
20–24	−6.8	4.6	4.8	5.0
25–29	−4.2	3.5	3.8	4.4
30–34	+8.1	2.2	2.5	3.4
35–39	−0.3	2.2	2.6	3.3
40–44	−3.8	3.1	3.4	3.7
45–49	−1.7	2.2	2.5	3.5
50–54	+1.3	1.9	2.4	3.2
55–59	−1.1	2.1	2.5	3.2
60–64	−0.3	1.9	2.2	3.0
65–69	+2.8	1.4	1.7	2.1
70–74	−1.0	1.3	1.6	2.0
75–79	+5.0	0.0	0.0	0.0
80–84	+0.0	0.0	0.0	0.0
85–89	+0.0	0.0	0.0	0.0
90–94	+0.0	0.0	0.0	0.0
95–100	+0.0	0.0	0.0	0.0

Figure 10 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of poverty rates for groups of households at a point in time, by sample size, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Sample Size n	Difference between estimate and true value			
	Diff.	Confidence interval (+/− percentage points)		
		90-percent	95-percent	99-percent
1	−2.8	74.5	78.3	89.8
4	−2.5	37.8	42.6	55.1
8	−1.3	26.3	31.6	42.2
16	−1.1	19.9	24.1	31.3
32	−1.0	13.9	16.9	21.0
64	−0.9	10.1	12.0	15.5
128	−0.6	7.1	8.5	11.4
256	−0.6	5.0	6.0	8.1
512	−0.6	3.5	4.0	5.5
1,024	−0.7	2.4	2.8	3.5
2,048	−0.6	1.7	2.1	2.7
4,096	−0.6	1.2	1.4	1.9
8,192	−0.6	0.8	1.0	1.3
16,384	−0.6	0.6	0.7	0.9

Figure 12 ($3.75/day 2005 PPP line): Differences and precision of differences for bootstrapped estimates of changes in group's poverty rates between two points in time, 2007 scorecard applied to the 2007 validation sample and to the 2005 *Encuesta de Hogares*

Sample Size	Difference between estimate and true value			
		Confidence interval (+/− percentage points)		
n	Diff.	90-percent	95-percent	99-percent
1	−4.2	105.5	106.5	111.6
4	−2.7	54.8	63.5	84.1
8	+0.1	36.5	44.1	59.5
16	+0.1	27.4	32.2	44.2
32	−0.0	19.6	23.1	30.3
64	+0.2	13.7	16.4	21.1
128	+0.4	9.8	11.9	15.1
256	+0.3	7.1	8.3	10.6
512	+0.3	4.8	5.7	8.0
1,024	+0.1	3.3	4.0	5.0
2,048	+0.2	2.2	2.7	3.6
4,096	+0.2	1.6	2.0	2.8
8,192	+0.2	1.2	1.4	1.8
16,384	+0.2	0.8	1.0	1.3

Figure 14 ($3.75/day 2005 PPP line): Households by targeting classification and score, along with "Total Accuracy" and BPAC, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Score	Inclusion: < poverty line correctly targeted	Undercoverage: < poverty line mistakenly non-targeted	Leakage: => poverty line mistakenly targeted	Exclusion: => poverty line correctly non-targeted	Total Accuracy Inclusion + Exclusion	BPAC See text
0–4	2.7	47.0	0.1	50.2	52.9	−89.1
5–9	5.1	44.6	0.2	50.1	55.1	−79.2
10–14	8.4	41.3	0.6	49.7	58.1	−65.0
15–19	13.4	36.3	1.4	48.9	62.3	−43.4
20–24	18.6	31.1	2.4	47.9	66.6	−20.3
25–29	22.9	26.8	4.1	46.2	69.1	+0.3
30–34	29.7	20.0	7.6	42.7	72.3	+34.7
35–39	36.0	13.7	11.9	38.4	74.4	+68.9
40–44	41.2	8.5	17.0	33.3	74.5	+65.7
45–49	45.0	4.7	23.1	27.2	72.2	+53.4
50–54	47.3	2.4	30.3	20.0	67.3	+39.0
55–59	48.7	1.0	36.9	13.4	62.2	+25.8
60–64	49.3	0.4	41.9	8.4	57.8	+15.7
65–69	49.6	0.1	45.5	4.8	54.4	+8.4
70–74	49.7	0.0	48.0	2.3	52.0	+3.5
75–79	49.7	0.0	49.4	0.9	50.6	+0.6
80–84	49.7	0.0	50.1	0.2	49.9	−0.8
85–89	49.7	0.0	50.3	0.0	49.7	−1.2
90–94	49.7	0.0	50.3	0.0	49.7	−1.2
95–100	49.7	0.0	50.3	0.0	49.7	−1.2

Inclusion, undercoverage, leakage, and exclusion normalized to sum to 100.

Figure 15 ($3.75/day 2005 PPP line): Households below the poverty line and all households at a given score or at or below a given score cut-off, 2007 scorecard applied to the 2005 *Encuesta de Hogares*

Targeting cut-off	% all households who are targeted	% targeted who are poor	% of poor who are targeted	Poor households targeted per non-poor household targeted
0–4	2.7	98.1	5.4	51.1:1
5–9	5.3	95.8	10.2	22.7:1
10–14	9.0	93.4	16.9	14.1:1
15–19	14.8	90.5	26.9	9.6:1
20–24	21.0	88.8	37.5	7.9:1
25–29	27.0	84.9	46.0	5.6:1
30–34	37.3	79.5	59.7	3.9:1
35–39	47.9	75.2	72.4	3.0:1
40–44	58.2	70.8	82.9	2.4:1
45–49	68.1	66.0	90.5	1.9:1
50–54	77.6	60.9	95.1	1.6:1
55–59	85.6	56.9	98.1	1.3:1
60–64	91.2	54.1	99.3	1.2:1
65–69	95.1	52.1	99.8	1.1:1
70–74	97.7	50.9	100.0	1.0:1
75–79	99.1	50.1	100.0	1.0:1
80–84	99.8	49.8	100.0	1.0:1
85–89	100.0	49.7	100.0	1.0:1
90–94	100.0	49.7	100.0	1.0:1
95–100	100.0	49.7	100.0	1.0:1

Appendix A: Definitions of Scorecard Indicators

The following information comes from:

Instituto Nacional de Estadística. (2007) *Manual del Encuestador/a, Encuesta de Hogares 2007*, La Paz.

<u>1. How many household members are there?</u>

According to page 8: "The household is a unit made up of people who may or may not be related to each other by blood, who live in the same residence, and who share arrangements for food preparation and eating, whether or not they all contribute to the related expenses. One person living alone counts as a household."

According to pages 27–28, only people who *habitually* live in the residence and who fulfill the criteria above should be counted as household members.

<u>2. How many household members ages 6 to 17 currently attend school at the level and grade that they enrolled in for this calendar year?</u>

The *Manual de Encuestador/a* does not provide additional information.

<u>3. What is the main construction material of the floors of the residence?</u>

According to page 92: "The main type of material is the only criteria for determining the quality of the floors. The response options are defined as follows:

- *Earth*: When the floor is not covered with any material
- *Wooden planks*: When the floor is covered with untreated wood that does not have a uniform shape and that is not fastened to the underlying surface
- *Hardwood floors/parquet*: When the floor is covered with parquet, hardwood flooring, or similar wooden material that has been processed for this purpose and that is usually fastened or nailed to the underlying surface
- *Rugs or carpets*: When the floor is covered by rugs or carpets
- *Cement*: When the floor is covered by a mixture of cement and sand
- *Tile (mosaic, stone, or ceramic)*: The floor is covered by small prefabricated blocks arranged on the underlying surface

- *Bricks*: When the floor is covered by bricks
- *Other*: Other material, for example cane, stone, etc.

Do not read the alternatives to the respondent."

4. What is the main fuel used for cooking?

According to page 95: "Keep in mind the following definitions (but do not read them to the respondent):

- *Firewood*: Chopped firewood, logs, *tola*, or *yareta*
- *Dung/manure*: Dried excrement from llamas, sheep, goats, cows, etc. (in the Altiplano, this is called *taquía*)
- *Kerosene*: This fuel is used in ovens and stoves, etc.
- *LPG (cylinder)*: This is a fuel used for cooking
- *Piped-in natural gas*: Natural gas supplied via a network of pipes
- *Others*: Fuels not included in the previous categories
- *Electricity*: A type of energy used for cooking (hot plates, electric stoves, etc.)
- *Does not cook*: When the household members do not cook the food that they eat

5. Does the household own, have, or use a refrigerator or freezer?

The *Manual de Encuestador/a* does not provide additional information.

6. Does the household own, have, or use a dining-room set (table and chairs)?

The *Manual de Encuestador/a* does not provide additional information.

7. Does the household own, have, or use a television?

The *Manual de Encuestador/a* does not provide additional information.

8. Does the household own, have, or use a VCR or DVD player?

The *Manual de Encuestador/a* does not provide additional information.

9. Does the household own, have, or use a stereo or hi-fi system?

The *Manual de Encuestador/a* does not provide additional information.

10. Are any household members employed in blue-collar or white-collar jobs?

According to page 54: "A *blue-collar worker* performs physical labor for a public or private employer and receives an hourly wage in-cash and/or in-kind. Blue-collar workers are usually found in sectors involved in the extraction and use of natural resources (such as agriculture or mining) or secondary/transformation activities (such as construction, manufacturing, etc.)

A *white-collar worker* uses intellectual skills or knowledge in the service of a public or private employer, receiving a fixed salary in-cash or in-kind. White-collar workers are usually found in administrative positions, management, technical positions, supervision, trade, and services."